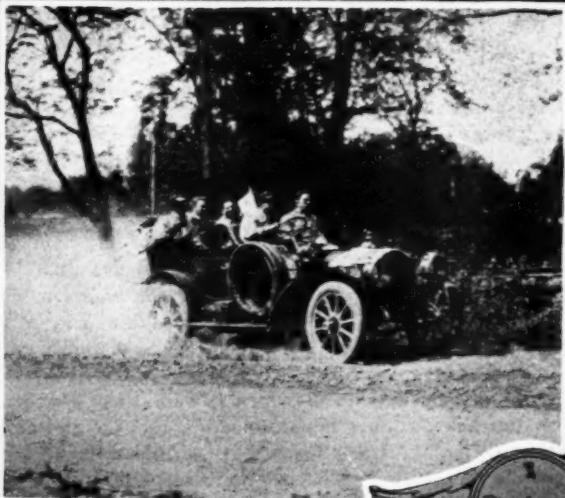


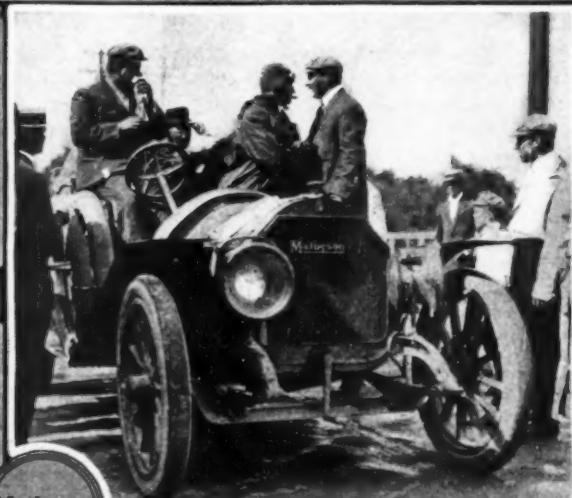
THE AUTOMOBILE

WASHINGTON'S RELIABILITY SUPPLIES A TIE

By H. G. Ward.



Packard



Matheson

WASHINGTON, D. C., May 18.—Packard and Matheson are tied in the top notch class of the reliability run of the Automobile Club of Washington, held Saturday last over a trying 165-mile course, which included Maryland and Pennsylvania roads, both good and bad. Apparently the Packard, driven by John Day, had survived the run with a perfect mechanical and road score. Subsequently a protest against this decision of the technical committee was filed by William Orme, entrant of No. 13 Matheson, which finished second with W. B. McBurney at the wheel, its score being four points away from perfect. Mr. Orme himself drove another Matheson car, which landed in the third place in the summary of Class A, with 26 points less perfect. The protest was based on the fact that the Packard had a loose grease cup on the rear spring, and, furthermore, it was claimed that the driver had worked on the car after the conclusion of the run and before it was turned over to the technical committee for examination. It is stated that at first the driver thought something was wrong with the ignition system, and subsequently he discovered that the trouble was due to the loss of a cover over the air valve in the carburetor. The driver had something to say about its having been tampered with, but eventually the cover was found in the pan underneath the engine.

The technical committee consisted of Robert B. Caverly, Fulton R. Gordon, and H. Chadwick Hunter. The cup for the class was

a handsome one offered by the *Washington Post*. Exactly what will be done with the tie is not known at this time, but it is among the possibilities that a run-off will be arranged in the near future.

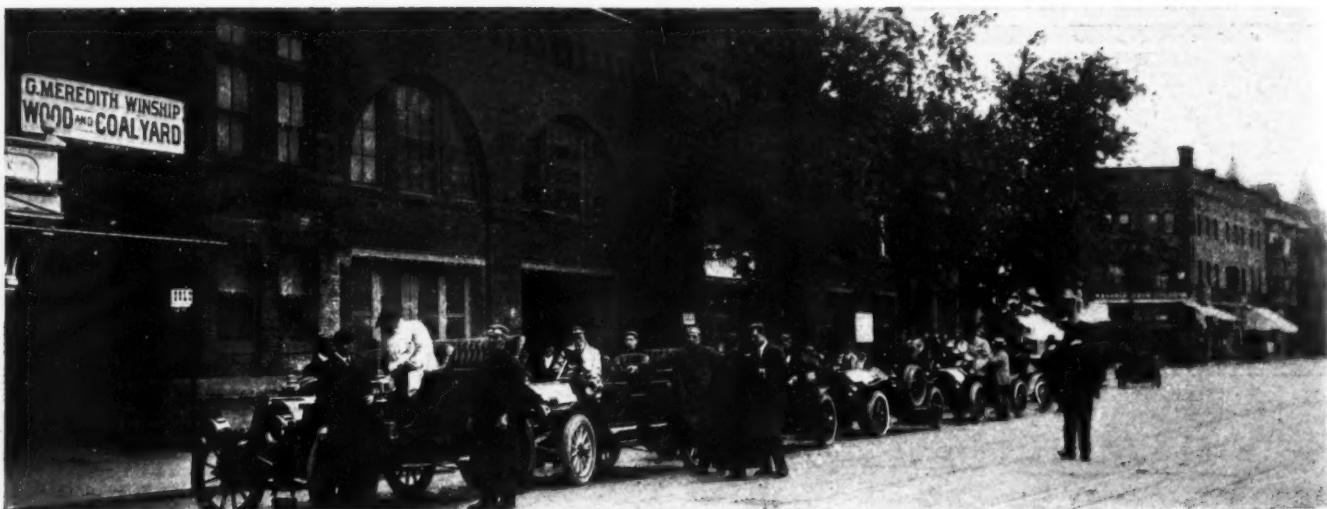
Class B, the cup for which was donated by the *Washington Star*, had a Model 17 Buick winner, perfect in its road score, but having a penalization of two points for a dead battery.

Class C, with the *Washington Times*, the donor of the cup, fell to the Model T Ford roadster, penalized fourteen points, ten of which were for lost time and four for technicalities reported.

Twenty-one cars were entered in the contest, but three failed to start. A Model KA Maxwell did not arrive in time from the factory, a Chase delivery wagon was scratched because certain gears did not come to hand, and a Thomas-Detroit was disqualified because its observer did not show up.

The course was one calculated to try the endurance of cars and drivers, being over various kinds of roads and crossing three mountain ranges. At Waynesboro, Pa., which was half the distance, a half hour's compulsory stop was made, where the contestants were permitted to replenish with gasoline. Water and oil could be taken on at any time under the rules.

The two Matheson entries showed a good performance, the No. 13 losing only four points for lost body bolts, having otherwise a perfect road and technical score. The other Matheson lost 24 points, according to the observer's time record.



Concluding Preparations for the Start of the Reliability Run of the Automobile Club of Washington

Fourth in Class A was the Franklin with 45 demerit points, 4 being for four lost spring clips, 12 on the observer's technical report, and 29 for being late.

If there was one car penalized that certainly had a tough break in the luck bag it was the Oldsmobile, driven by O. W. Hoffman. This car was penalized 4 points for being late at the finish, a condition brought about by the melting of a connecting rod bearing, for which an additional penalty of 50 points was assessed. This happened only a few yards from the finish line and the car had a perfect mechanical and road score up to this time. The fact that the car was entered late, and was taken right off the sales floor of the local Oldsmobile dealer without having any tuning up whatever, accounts in a measure for the trouble.

Another Oldsmobile, a Model X Special, also came in for a bit of hard luck. It sustained a penalty of 65 points; 33 of which were levied on the observer's report. It also had 2 points against it for a turned shackle, 3 points for a loose frame bracket, 25 points for a damaged wheel, and 2 points for being late. Twelve miles from the finish this car, driven by Tyser, cast a front tire and it came home on the rim, being only a minute late. Tyser did a sensational piece of driving that was acknowledged with applause by the hundreds at the finish line.

The Columbia lost 2 points for a loose spring clip, 46 points for being late, and 25 points on technical examination. The Pullman sustained a loss of 154 points, 2 of which were for a loose muffler pipe, 2 for lost chassis bolts, 10 for a loose thrust bearing, 110 on the observer's report, and 30 for being late. The other Packard suffered the heaviest penalty of all, due to a broken spring. It lost 1,860 points for being late, 2 for a broken

seal, 35 for broken spring leaves, 2 for a loose spring clip, 2 for a loose muffler pipe, 2 for a loose mudguard, and 38 on technical examination.

In Class B the Chalmers-Detroit was assessed 16 points on the observer's technical report. Twenty-six points went against the Stoddard-Dayton, 2 for a broken oil lead, 1 for a loose spring clip, 2 for a turned shackle, 10 for lateness, and 10 on the observer's technical report. The Wayne was disqualified because it was removed from the official garage before the examination by the technical committee.

In Class C the Reo roadster had a loose oiler when the car started, but the driver forgot to declare this fact to the committee the night before the start. The technical examination disclosed this fact and 20 points were charged, together with 2 points for stalling the engine twice. A Ford, driven by Machin, had a time penalty of 22 and 2 points for a loose muffler pipe.

The two Brush entries had hard luck. No. 11, driven by Nichols, had a broken web, for which it was assessed 50 points; 284 points for being late; 25 points for a lost tool kit, and 2 points technical. The other Brush had a loose cylinder nut, costing 2 points, while 70 points were levied for being late.

CLASS A—CARS COSTING \$2,500 AND OVER.

Car.	H.P.	Bore	Stroke	Model	Driver	Penalty
1. Packard	30	5	5	1-8	John Day.....	4
1. Matheson	50	5	6	E	W. McBurney.....	4
2. Matheson	50	5	6	E	Jas. Orme.....	24
4. Franklin	28	4 1-4	4	D	M. S. Bates.....	45
5. Oldsmobile	40	4 3-4	4 3-4	D	O. W. Hoffman.....	54
6. Oldsmobile	35	4 1-2	4 1-2	X	Frank Tyser.....	65
7. Columbia	28	4 1-4	4 1-2	48	A. B. Cohen.....	73
8. Pullman	40	5	5	1-4	J. R. Thomas.....	154
9. Packard	24				I. Freund.....	1941

CLASS B—CARS COSTING FROM \$1,251 TO \$2,499.

1. Buick	30	4 1-2	5	17	J. Muehleiser.....	2
2. Chalmers-Detroit..	24	3 7-8	4 1-4	F	A. S. Zell.....	16
3. Stoddard-Dayton..	35	4	5	9C	C. Barnard.....	26

CLASS C—CARS COSTING LESS THAN \$1,251.

1. Ford	20	3 3-4	4	T	C. E. Miller.....	4
2. Reo	20	4 3-4	6		Geo. Thomas.....	24
3. Ford	20	3 3-4	4	T	H. G. Machlin.....	72
4. Brush	8	4	4 1-2	BC	D. W. Bussey.....	72
5. Brush	8	4	4 1-2	BC	R. W. Nichols.....	1361

SAVANNAH TO AUGUSTA ENDURANCE RUN.

SAVANNAH, GA., May 17.—The Savannah Automobile Club is arranging for an endurance run from this city to Augusta, a suggested date being May 31. An extensive prize list is being planned, and a large entry is assured for the event.

DATE FOR DELAWARE ASSOCIATION RUN.

WILMINGTON, DEL., May 17.—At a meeting held recently the Delaware Automobile Association selected Saturday, June 12, as the date for the proposed sealed time run. The course will be from Wilmington to Dover and return.



Officials in Charge of the Reliability Run.

From left to right: Robert B. Caverly, referee; H. C. Hunter, Judge; Wm. D. West, pilot and president of the club, and J. K. Heyl, clerk. An energetic quartet of Washingtonians.

"SONS OF OLD ELI" ARRANGE HILL CLIMB.

NEW HAVEN, CONN., May 17.—Shingle Hill will be enlivened for the second time by the annual hill climb of the Yale University Automobile Club, on May 26. Motorcycles and automobiles will have the right of way on that day, with three classes for the former, a popular mode of transportation around this city among the students, and seven classes for autos. Under the sanction and rules of the A. A. A. there will be a price classification for the cars, and a piston displacement for the two-wheelers, with free-for-alls for both. Shingle Hill is a winding road of macadam located near this city, about 5,000 feet long, and with grades varying from nothing to 20 per cent. There is an abrupt rise at the start, a short level stretch, at the end of which there is a sharp S turn and a steep climb to the finish. The record is held by David Bruce Brown, who made the ascent in the Fiat Briarcliff racer in 1:06 4-5.

Robert Lee Morrell will act as referee and C. H. Gillette as A. A. A. contest board representative. Post & Lester have donated a valuable cup for the free-for-all in the automobile division, and a gold medal will be given by the club to the member who makes the fastest time of the day. Cups will be given to the winner of each event. Entry blanks may be obtained from R. E. Wiles, secretary Yale Automobile Club, Yale Station, New Haven, Conn.

FOR THE BABY TONNEAU CLASS.

DETROIT, May 17.—Gliddenites contesting in the baby tonneau class will have an added incentive this year, as the result of action taken by the city of Detroit. When it was first determined that Detroit would be the starting point for the big tour in July Mayor Breitmeyer urged that the municipality offer a suitable trophy, to be put up annually, as is the case with the other cups that feature in the Glidden tour. The idea met with general approval, and the sum of \$250 was appropriated for the purpose. Rivalry was keen among local jewelers for the honor of furnishing the cup, the design submitted by Wright, Kay & Company finally being accepted by the committee. The cup is a massive affair of china, beautifully decorated with hand painting.

The Wyoming Auto Transit Company, which runs automobile stages from Rock Springs to Yellowstone Park is preparing to make a test of the autofreight truck. The distance from Rock Springs to Pinedale is 120 miles. It is expected to make the distance in 10 hours with a cargo of four tons.

AUTOISTS FIGHT GARAGE ORDINANCE

MILWAUKEE, Wis., May 17.—Several sections of the proposed garage ordinance for this city have been considered so drastic that the local tradesmen and the automobile club have determined to fight its adoption by common council. Among the provisions are the following:

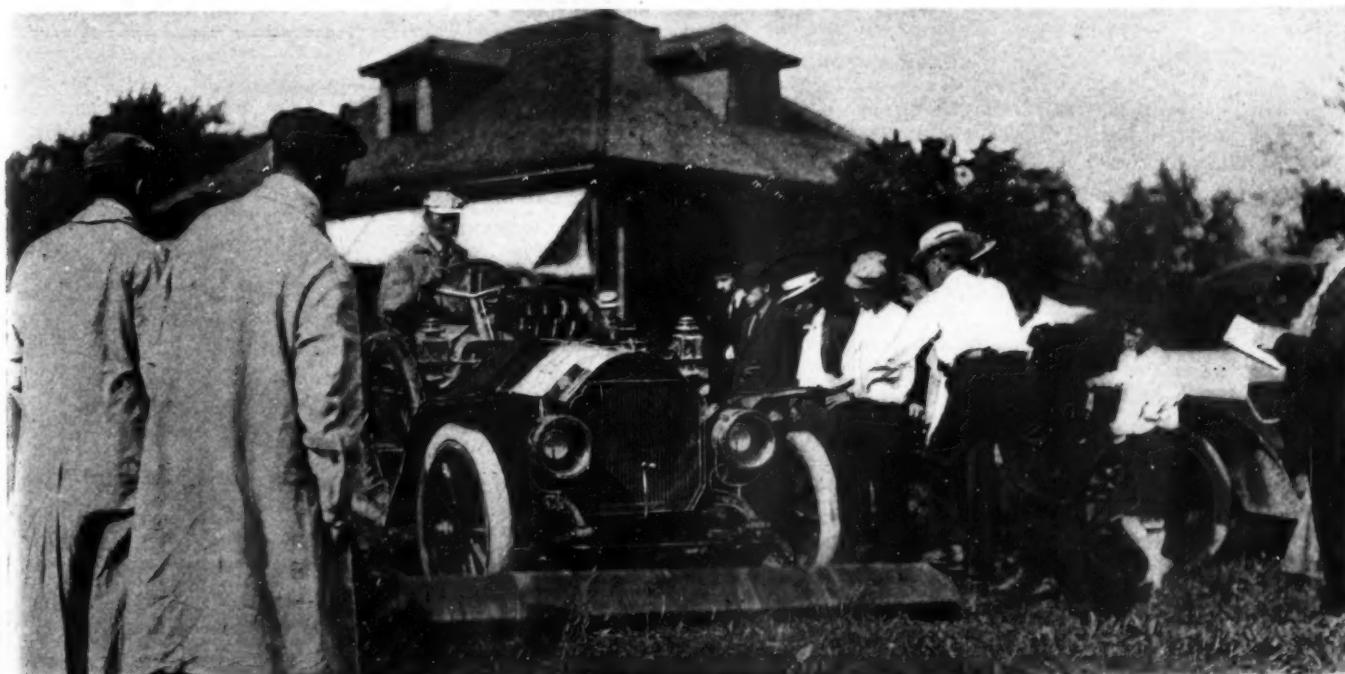
No garage may contain more than ten gallons of inflammable liquid in approved safety cans or more than 550 gallons in underground storage tanks. Not more than 120 pounds of calcium carbide may be kept. All fires and lights shall be extinguished before the car is brought into the garage and shall not be lighted while the car is in it. No stove, forge, torch, boiler or other furnace, flame, fire, or fire heat, no electric motor, hoist or exterior sparking device, and no artificial light, except incandescent electric globes will be permitted in any garage or portion of a garage that is not provided with an entrance on the outside of the building and separated from the garage by unpierced, approved fire walls and doors. Electric charging apparatus shall not be installed in a garage equipped for handling gasoline or other volatile inflammable liquid until the plans and method of installation have been approved by the fire chief and building inspector. The ordinance absolutely forbids smoking. A plentiful supply of sand must be kept on hand at all times for fire fighting purposes.

DOZEN PERFECT SCORES IN TRENTON RUN.

TRENTON, N. J., May 17.—In the Delaware Valley endurance run held to-day by the Trenton Dealers' Association there were twelve cars with perfect scores, out of 21 starters. The course was about 158 miles in length, going through Princeton, Bernardsville, Hackettstown, Easton, and down the valley to the finish. The perfect score cars and drivers were: Peerless, Manning; Pullman, Hardesty; Oldsmobile, Druck; Crawford, Gillim; Stoddard-Dayton, Moon; Midland, Hayes; Regal, Aller; Ford, Mosher; Mercer, Wehner; Overland, Van Horn; Buick, Eisenberg; Maxwell, Toman. The cars ran on an eight-hour schedule, with penalties for being ahead or late, and for motor stops.

TIRES BURNED IN AKRON, O., FIRE.

AKRON, O., May 18.—Fire in the seven-story Hower block to-day practically destroyed the building and its contents, causing a loss which it is thought will aggregate \$1,500,000. The building was occupied entirely by light manufacturing companies. The cause of the fire is unknown. Both the Goodrich Rubber Company and the Diamond Tire Company had thousands of dollars worth of tires stored in the building. The tires are a complete loss. There is about \$800,000 insurance on building and contents.



Clutch Testing of the Technical Inspection at the Conclusion of Washington Endurance Run.



Lined Up Near the Automobile Club of Maryland, After the Return, for the Tests and Technical Examination.

SUMMARY OF WINNERS.

Winton and Packard Tie in Class A.
Studebaker Takes Class B.
Franklin Perfect in Class C.

BALTIMORE, May 16.—Winners in the sealed bonnet contest and endurance run conducted by the Automobile Club of Maryland from Baltimore to Gettysburg and return, yesterday, were cars Nos. 1, 2, 3, 4 and 11. Cars Nos. 1 and 2, a 48-horsepower Winton, driven by B. B. Tatum, and a 30-horsepower Packard, driven by E. R. Marshall, were tied for first position in Class A, for touring cars over 30-horsepower, each being penalized two points. A loose fender bolt caused the Winton car to lose its points on technical examination, while the Packard was prevented from making a perfect score by taking on a quart of water. Car No. 3, the 40-horsepower Studebaker driven by Robert Yerger, captured the Class B event for tourabouts of over 30 horsepower, with a perfect score, while the 28-horsepower Franklin, driven by John L. Burns, was the headliner in Class C for touring cars under 30-horsepower, with a perfect mark. These were the only two cars of the twelve contestants that made the run without having a bad mark registered against them. The winner in Class D, for tourabouts under 30-horsepower

was the tiny 16-horsepower Hupmobile which was penalized two points because the chauffeur put some water in radiator. This infraction put two bad marks in the water test column for this midget machine. Even the two perfect score cars were at first held up on small technicalities, the Studebaker for dropping a New York license and the Franklin for using oil on the engine through a misunderstanding. The penalties in these two instances, however, were waived.

A novel stunt was put through by the entrant of the Winton cars. This was nothing less than the act of fastening over the usual quadrant, a steel plate with but two notches cut in it. In this way, it was impossible to engage other speeds than the high and the reverse as per the two notches, the steel plate covering up all others. The idea was to demonstrate the flexibility of the "six" in a startling but convincing manner. Owing to this plate, at one control it was necessary to run the engine no less than three hours and five minutes. The Winton arrived this much ahead of time, and had to keep the motor running or lose points.

The distance covered by the contestants was 136.5 miles and for the most part was over rough and rocky roads which proved a severe test for the machines. From Baltimore the motorists headed for Frederick, Md., where at James E. Solt's garage was the first checking station. This was a distance of 46.5 miles, during which many places of interest were passed. There were

SUMMARY OF THE SEALED BONNET RUN OF THE AUTOMOBILE CLUB OF MARYLAND, MAY 15, 1909.**CLASS A—FOR TOURING CARS OVER 30 HORSEPOWER.**

No.	Car	H.P.	Cyl.	Piston	Model	Entrant	Driver	Road Test	Water Test	Brake Test	Exam-ination	Ties	Total	Remarks
1	WINTON	48	4 1/2	5	17-6	Winton Motor Car Co.	B. B. Tatum	0	0	0	2	2	2	Fender broke loose.
2	PACKARD	30	5	5 1/2	30	M. S. Hess	E. R. Marshall	0	2	0	0	2	2	Took quart water.
5	OLDSMOBILE	35-40	4 3/4	4 3/4	....	Olds Motor Works Branch	E. L. Leinbach	Broke pin in differential and withdrew.	Contestant finished run in time, however.					
10	THOMAS	60	5 3/4	5 3/4	4-60	A. Y. Webster	L. J. Wellstood	0	2	0	32	34	34	Throttle control bad. Stopped motor.

CLASS B—FOR TOURABOUTS OVER 30 HORSEPOWER.

3	STUDEBAKER	40	4 1/2	5 1/2	D	D. C. Walker	Robert Yerger	0	0	0	0	0	0	Dropped N. Y. license. Unpenalized.
7	GEETH	35-40	4 3/8	5 1/2	Type XXF	W. Sandruck	F. W. Sandruck, Jr.	0	0	0	45	45	45	Leaky gasoline tank. Muffler pipe broken.
8	STODDARD-DAYTON	45	4 1/2	5	K-09	Stoddard-Dayton Baltimore Co.	L. H. Schaab	0	12	0	0	0	12	Loose water connection.

CLASS C—FOR TOURING CARS UNDER 30 HORSEPOWER.

4	FRANKLIN	28	4 3/4	5	D	Mar Del Mobile Co.	John L. Burns	0	0	0	0	0	0	Oiled engine through mis-understanding. Penalty waived.
12	OAKLAND	20	4 1/2	5	....	Little Joe Weisenfeld	E. C. Briggemann	8	2	0	57	67	67	Pin gone out of front spring and engine pound

CLASS D—FOR TOURABOUTS UNDER 30 HORSEPOWER.

11	HUPMOBILE	16	3 3/4	3 3/8	....	Little Joe Weisenfeld	G. C. Cook	0	2	0	2	2	2	Water put in radiator.
6	MARYLAND	26	....	....	....	James G. B. Davy	James G. B. Davy	38	0	0	0	38	38	Delay due to 6 blowouts; otherwise perfect.
9	OVERLAND	30	4	4	30	C. S. Houghton	M. C. Jones	0	0	0	62	62	62	Pin out of rear spring. Loose distance rod and wheel.
14	REO	20	4 3/4	6	....	Little Joe Weisenfeld	....	0	0	0	1000	1000	1000	Dropped gasoline tank.
15	HERRESHOFF	20	....	....	....	Ford Auto Co.	....	....	....	....	....	....	Failed to start.	

OFFICIAL CARS.

Winton	Pathfinder	Oldsmobile	Press Car.
Packard	Pilot	Packard	Pacemaker

Referee—Frank S. Darling.

Technical Committee—Dr. H. M. Rowe, George R. Snodall, and Frank W. Darling.

a number of water bars between these two points, but outside of these the going was comparatively smooth and easy. The first car to meet with a mishap was the 30-horsepower Packard car, driven by George A. Yakel, which was the pilot car. The pilot had departed from Baltimore at 6:54 A. M., a little more than an hour ahead of the first started in the run. When the Packard reached a point just outside of Ellicott City, about 12 miles from Baltimore, it lost its gasoline tank. This caused such a delay that it was passed by the pacemaker, also a 30-horsepower Packard, driven by E. R. Marshall, which, together with several other cars, arrived at Frederick ahead of the pilot. The latter was also behind in its arrival at Gettysburg. These accidents caused the pilot to be penalized 1,000 points on technical examination. The only other serious accident was the breaking of a pin in the differential of No. 5 car, a 35-40 Oldsmobile, driven by E. L. Leinbach, which made it necessary for Mr. Leinbach to break the seal. The car was immediately withdrawn, but after being repaired was taken over the course within the time limit by O. C. Hoff, Mr. Leinbach having in the meantime taken the steering wheel of the press car Oldsmobile.

As a means of settling the tie with the Packard, the Winton people propose to seal up everything on both cars but the gasoline and oil tanks, and then run the two cars in competition until either one or the other fails.

From Frederick the route was by way of Thurmont and

Emmitsburg to Gettysburg, where the second checking in was made at the Gettysburg Motor Car Company's garage. There the motorists were allowed an hour for luncheon or a spin around the battlefield. Those that laid over were permitted to stop their motors without suffering a penalty, providing no work was done on the cars.

From Gettysburg the trip was through Littlestown, Pa., Westminster, Reisterstown, Chattolanee and Eccleston to the Pimlico entrance of Druid Hill park. From there the cars went through the beautiful park to the Automobile Club of Maryland, the last checking station. Two and three-quarter hours were given the cars for the run from Baltimore to Frederick; two hours running time from Frederick to Gettysburg, and three and three-quarter hours for the return trip from Gettysburg to Baltimore. Two of the cars that were entered in the contest did not start. They were the 20-horsepower Herreshoff, by the Ford Auto Company, and the 20-horsepower Reo, by Little Joe Wessenfeld. The other cars and the mishaps for which they were penalized for were the 26-horsepower Maryland, six blowouts; the 35-40 Gaeth, a leaky gasoline tank and muffler pipe broken; Stoddard-Dayton, 45-horsepower, loose water connection; Overland, 30-horsepower, pin out of rear spring and loose distance rod and wheel; Thomas, 60-horsepower, throttle control bad and stopped motor; Oakland, 20-horsepower, pin lost from front spring and engine pound.

SOUTH AROUSED BY NEW YORK TO ATLANTA HIGHWAY

ATLANTA, GA., May 17.—When a national highway from New York City to Atlanta was proposed by the New York *Herald* and the Atlanta *Journal*, to be fostered through the holding of an automobile contest between the two cities just before the opening of the national automobile exhibition here, it was hardly likely that the interest aroused was imagined. There has been nothing suggested in the memory of the Southerners of to-day which has caused this entire section of the country to stand up and concentrate its enthusiasm as has this movement. If a hundred circuses, the love of all people, should travel through the States of Virginia, the Carolinas and Georgia, it is hardly likely that the sentiment of welcome would be more hearty. Every little town on the three proposed routes, every county, mayors, congressmen, legislators and governors, are vying with each other in expressing support of anything that will give the South good roads, and consequently do more to benefit it than anything that has happened since the war. Railroads only tap a portion of the country, and it is hoped that with trunk lines of splendid highways there will be an awakening of great economic importance.

The two newspapers have offered prizes to the counties which have the best roads, the *Herald* giving sums of \$1,000, \$500 and \$200 for the sections between New York and some point midway to Atlanta, and the *Journal* giving corresponding amounts for those in the Southern half. Indeed the whole movement below the Potomac River has become one of the road question with the automobile endurance contest a mere means to an end. The action of the National Association of Automobile Manufacturers in deciding to hold an exhibition of national importance in this city from November 6 to 13 has been very gratifying, and the interest will be greatly increased by the endurance contest, for which cash or plate prizes will be given. The fact that there are three routes under consideration and the one selected must qualify by its highway condition has given additional incentive to work.

The routes suggested are combined from New York to Philadelphia, when one goes west to Harrisburg, thence down the Cumberland Valley to Harper's Ferry, and through the Shenandoah Valley to Lexington, crossing the mountains to Martinsville and Salisbury, N. C., where it joins the route of the second suggestion. From Philadelphia to Washington there are

two routes combined, one of which from the national capital goes to Rapidan, Charlottesville, Lynchburg, Danville, Greensboro and Salisbury, the two from that point running to Atlanta via Charlotte, Blackburg, Spartansburg, Hartwell and Winder.

The third course leaves Washington for Richmond, Petersburg, Raleigh, Columbia, S. C., and Royston, joining the others at Winder. The distance is about 900 to 1,000 miles on any of these routes, and so it is a matter of the one offering the best road. It has been suggested by the Richmond people that the Lincoln highway, being considered by Congress, would be more appropriate if built between Washington and Richmond, thus cementing the North and the South, than between the capital and Gettysburg. Another feature of this route is that it includes the capitals of all four of the Southern States, Richmond, Raleigh, Columbia and Atlanta. The difficulty is that the roads in this section are probably the worst to be found, taken as a whole, whereas those on the route through Harrisburg and the Shenandoah Valley are the best, except that they abound in water breaks and may be cut out on that account.

The first scout car has left Atlanta, a White steamer, driven by E. W. Gans, with the others of the party: Frank S. Welden, president of the Interstate Highway Association; E. H. Inman, president of the Fulton County Automobile Club; John S. Cohen, managing editor, and a *Journal* staff man. Early in June it is planned to start a car from New York and work down, the notes taken being responsible for the decision as to the best way South. Interest unquestionably is general and spreading.

MOTORDROME FOR ATLANTA WINTER RESORT.

ATLANTA, GA., May 17.—Feeling that an automobile race course is a valuable adjunct to the modern winter resort, promoters of a magnificent hotel to be built in this city, on which nearly a million dollars will be spent, have started plans for a motordrome. Asa Candler, Jr., and some of the wealthiest young men in the city have organized a company and secured options on 200 acres of land on which they say that about \$250,000 will be expended in making it a race track of note, with grand stands and accompanying buildings. This is part of the plan, it is stated, for the popularizing of the new hotel, and on a two-mile circuit there will be races several times a year.

OFFICIAL RESULT OF ONE-GALLON MILEAGE TRIAL FOR PLEASURE CARS, NEW YORK CITY, MAY 7, 1909.

	Style	Class	No.	Driver	Weight in lbs. Body	Contest Car Weight	Live Load Weight	% Dead Weight Load	Time of Car Passenger, H.m.	Distance Travelled Miles	Speed M.P.H.	Score Tons Miles
1	Franklin	Touring	C	S. G. Amrit	2880	1900	980	51.5	196	2-57	358	12.1 103.04 51 ²²
2	Cadillac	Rabbit	A	J. R. Burne	2325	1625	700	43	146	3-6	426	13.8 99.45 49 ²²
3	Lozier	Touring	F	C. E. Mose	5230	4025	1205	284	172	1-19	171	13.1 89.43 44 ²¹
4	Matheson	Touring	F	A. D. Hall	5500	4450	1150	258	164	1-18	155	12.0 86.80 43 ²¹
5	Buick	Touring	B	H. P. Cook	3070	2230	840	376	168	2-7	262	13.3 86.57 43 ²²
6	Fiat	Coupe	E	P. DeRoma	3260	2530	730	288	146	1-34	259	16.5 84.43 42 ²¹
7	Chalmers-Dt.	Touring	C	E. M. Bowers	3045	2275	770	382	140	1-26	257	18.5 78.30 39 ⁴³
8	Lancia	Touring	E	C. H. Jaeger	3220	2650	660	257	165	1-25	239	16.8 76.95 38 ⁴²
9	Thomas(Taxi) Cab	G	4	O. Hansen	3385	2730	655	24	154	1-41	227	13.5 76.83 38 ⁴²
10	Chalmers-Dt.	Touring	C	F. T. Cawthon	3205	2370	835	382	167	1-32	21	14.8 67.30 33 ⁴³
11	Cadillac	Demi-Tour	C	I. N. Udepera	3115	2530	585	232	146	1-27	2155	14.1 67.12 33 ⁴⁴
12	Overland	Rabbit	B	G. O. Peiss	2580	2150	430	20	143	0-49	242	13.0 62.43 31 ²²
14	Renault	Lezecchi	F	P. L. Croix	4215	3530	685	194	137	1-10	133	11.4 56.03 28 ⁴³
13	Buick	Tourabout	B	J. D. Jones	2105	1695	410	246	137		27	56.03 28 ⁴¹
15	Brush	Rabbit	A	M. McLaren	1370	1080	290	268	145	2-39	406	15.3 55.62 27 ⁴¹
16	DeDion(Taxi) Cab	G	5	E. Carter	3090	2460	630	256	126	1-19	18	13.8 55.62 27 ⁴¹
17	DeDion(Taxi) Cab	G	4	N. Cullen	3050	2400	650	252	162	1-26	17.5	12.5 54.29 27 ⁴²
18	Overland	Touring	D	H. Cassidy	3345	2690	655	244	164	0-49	16	19.5 53.50 26 ⁴³
19	Kissel	Touring	C	J. Hopkins	3290	2435	865	351	171		13.3	43.75 21 ²²
20	Brush	Rabbit	A	H. Moore	1420	1110	310	224	155		20.9	29.67 14 ⁴⁴
Total:					62800	48775	14025					
<i>Average for all cars</i>					3140	2438	701	28%				
<i>Weight per HP</i>												
<i>Course: Start, Automobile Club of America, New York, over Queenboro Bridge and 17 miles east into Long Island, then south Roads: beyond bridge average good macadam for American road; rolling terrain</i>												
<i>Class Winners</i>												<i>Committee:</i>
<i>A 650 & under B 651 to 1250 C 1251 to 2000 D 2001 to 3000 E 3001 to 4000 F 4000 & over G Taxicabs</i>												<i>Clyde Schuyler Chairman Coker F. Clarkson L. M. Bradley W. W. Neumann Treasurer</i>

ONE-GALLON CONTEST TOLD IN OFFICIAL STATISTICS.

THE two tables shown on these pages represent the final results of the New York Trade Association's One Gallon Economy Test, and an examination of them reveals some very interesting facts. The cars are arranged in the order of their final standing, with the winning Franklin at the head.

A study of the time-distance-speed columns show that the first four car drivers all adopted the same speed. This averages 12.75 miles per hour, while the average for all but three, whose figures are not available, is 14.37 miles per hour. The winning car had a speed which was the third lowest in the contest, the highest speed noted, on the other hand, being that of a car placed last of those whose time was given. From these facts one would argue that slow speed was more economical of fuel, the speed used among the first four being about equal to one-third the normal engine speed, with the direct drive or high gear engaged. It is to be regretted in this connection that the committee in charge did not have the observers secure data relative to the gear used.

The winner, for instance, used 32-inch wheels, and the gear reduction was 3 3-4 to one. Figuring backward from these and the actual average speed, the average engine revolutions were almost exactly 477. As the normal engine speed is given as 900, this is only 53 per cent. of full speed.

The next car in order for which reduction figures are obtainable, the Lozier, figures back to less than 300 engine revolutions if the high gear was used. As this very slow speed of the engine would not be an economical one, it is doubtless true that the driver of this car pinned his faith to a lower gear than the direct drive, figuring that other economies attendant upon this would offset the transmission losses on the indirect speed.

In connection with the speed comes the question of passenger mileage. This would be equal to the number of passengers times the mileage. In the first four instances the figures are: 1, Franklin, 179; 2, Cadillac, 170.5; 3, Lozier, 119.6; 4, Matheson, 108.3. The peculiarity of these figures lies in the large gap between the first two, averaging 174.75, and the second two, which only average 113.95. The two former being so close together, practically alike, while the others are also practically alike but with 60 passenger miles intervening, makes a very funny situation.

This same peculiar situation relative to passenger miles obtained in the two-gallon test held in May, 1906. The highest passenger mileage was then made by the Mack observation car with 171.3. Between this and the two closest competitors there was a very large interval, the Frayer-Miller scoring 119.75 and the Darracq 116.1. Here the first car made a score practically identical with the score of the first two cars in the One Gallon Contest, while the two next made totals almost identical with those of the third and fourth cars of last week.

The high efficiency of the first two cars rested on the proportion of live or passenger weight to the dead weight of the cars. These cars were two of the five which weighed less than a ton, but none of the other very light weight cars made a very good showing. An examination of the column headed "live load in per cent. of total" tells the story. The two highest percentages in the contest were those of the first and second place winners.

Windage areas tell a funny story, too. The apparent use of a small area, and consequent lessened wind resistance, was not taken into account by any one, as the results show that the large

and small areas in combination with large or small scores "just happened." In the group including the four best scores is included the highest wind area, while the fifth car had the second largest. On the other hand, the lowest frontal area went with the fourteenth place. The winner had neither a large nor a small figure, and in arranging the cars for wind area would come in seventh place. The only deduction possible from these figures is that the wind resistance does not enter up to a certain speed, or certain very large area, both of which were not exceeded in the contest under consideration. As a matter of fact the car making the greatest speed of the day attained but 20 miles per hour, so that this low speed accounts for the lack of connection between the frontal area and the result. The car just mentioned, by the way, stood tenth on the area list, only two others intervening between it and the winning Franklin.

Once more the officials in charge are to be congratulated on their painstaking efforts which resulted in the tables from which the above deductions are made.

PORTER HILL FOR CLEVELAND CLIMB.

CLEVELAND, May 19.—It's back to Porter Hill for the 1909 climb of the Cleveland Automobile Club. This is the slope that was used last year and is ideal with the exception of its unhandy location. The hill itself is practically ideal, being an exact half mile, with just enough room at the finish for a straightaway brush. There is practically no chance of an accident, while spectators can secure an excellent view from almost any point.

The club is starting an active campaign for entries and it is believed that the lists will be better filled this year than on any

previous occasion since 1906, the last time the climb was held at Gates Mills. As a whole, the local dealers are enthusiastic about the event, in marked contrast to their stand last year.

The roadway proper will be graded and smoothed by the Automobile Club officials at once, while the rural residents will give their assistance in this work, as they are in favor of the climb being held there.

WILL CLIMB DEAD HORSE HILL ONCE MORE

WORCESTER, MASS., May 17.—On Saturday, June 12, the Worcester Automobile Club will hold its annual hill climb, Dead Horse hill being once more the scene of activity. This is just a mile long, starting with a slight down grade and then rising abruptly. The first grade, after crossing the bridge, is of 10.3 per cent., but this is not the worst, as up at the half-mile post is a steep stretch which averages 12.2 per cent.

There will be a full list of events, totaling sixteen. These include the first of the M. C. A. classes as far as piston displacement and minimum weight are concerned. In price classification, however, six additional classes are provided. Event number six takes care of the motor cyclists, and numbers seven and sixteen will give the steamers their chance.

ALBANY HILL CLIMB FOR JUNE 5.

ALBANY, N. Y., May 17.—The second annual hill climb of the Albany Automobile Club has been postponed to June 5, that being the first day on which the roads can be closed. The entry blanks have been issued, and may be secured from the club headquarters. There are seventeen events on the program.

OFFICIAL RESULT OF ONE-GALLON MILEAGE TRIAL, NEW YORK CITY, MAY 7, 1909.—(Continued)



Chalmers-Detroit Tackling a Tough New Mexican Grade on Its Way to Mexico City.

EIGHT PERFECT IN DETROIT RUN, DESPITE WEATHER

DETROIT, May 17.—Eight perfect scores and one penalization protested to the A. A. A. was the outcome of the four days' endurance contest held under the auspices of the Detroit Auto Dealers' Association, and which ended Saturday afternoon in the midst of a good-sized cyclone.

The six hundred and fifty miles embraced in the tour were covered under conditions never before encountered by local autoists in a similar event, and the fact that eight crossed the line with a clean slate must be regarded as a high tribute to the staying conditions of the cars and the skillful work of their drivers. A week's steady downpour made it advisable to postpone the start for a day, in the hope that roads rendered well nigh impassable would improve a trifle. The run on Wednesday was through a sea of mud that made going anything but a joy. Before the cars pulled out Thursday morning J. Pluvius once more trotted out his watering pot, and the heavens leaked until participants in the run were soaked to the skin.

Friday's run was under a clear sky, but over roads from which the bottom had dropped until its recovery seemed impossible.

An hour before the close of Saturday's run the autoists ran into a rainstorm that quickly developed into a full-fledged cyclone. Barns were lifted from their foundations, trees blown down and not less than two-score telephone poles laid low across the path of the cars in something like two miles. Lee Lorimer, driving a Chalmers Thirty, was picking his way through a downpour of rain that made it difficult to see fifty feet ahead when there came a quick succession of reports and a long row of poles fell across the road with a crash, the first being but a few yards ahead of the car. Applying the brakes quickly, at the risk of putting the car into the ditch, Lorimer barely missed striking the pole. Almost at the same instant there were other reports at the rear, and looking back the occupants of the car saw three poles drop just behind them, with a Maxwell Thirty and an American Simplex just outside the barriers.

With the aid of farmers who came hurrying to the scene the three poles were lifted from the road, allowing the Chalmers car to back out and take another course followed by the other cars. This resulted in a delay of forty-five minutes on a schedule that was nearly exhausted, and from that point into the city it was a wild race to get under the wire.

There was no lack of excitement through the entire day, owing to the frightful condition of the roads. The confetti car stuck in the mud ten miles out of Port Huron, and the confetti

was passed over to the press car, and finally turned over to another machine, which marked the trail. More than once the cars were held up by the mud until fence rails could be laid down to form a roadbed, all hands assisting in the task, owners of rival cars vying with each other in helping to remedy conditions that could not under any circumstances have been worse.

Tire troubles were so numerous that after the first day they attracted little attention. One of the contestants was compelled to make nine changes in three days, all due to punctures, and others were close rivals for second place in this respect. Cars were divided into three classes, in each of which the prize was a handsome trophy donated by the local press. The entries and official score of all cars entered follows:

CLASS A—CARS LISTED AT \$2,000 AND OVER.		
No.	Car.	Driver.
3.	Chalmers Forty	Machesky
4.	Stoddard-Dayton	Tuttle
5.	Chalmers Forty	Vincent
8.	Stoddard-Dayton	Neumann
10.	Franklin	Carrin
6.	Stevens-Duryea	Scofield
1.	Pope-Hartford	Bemb
2.	American Simplex	Woods

CLASS B—CARS LISTED AT \$1,500 TO \$2,000.		
No.	Car.	Driver.
11.	Chalmers Thirty	Lorimer
12.	Maxwell Thirty	Goldthwaite
13.	E-M-F Thirty	W. Lane
15.	Chalmers Thirty	Bamford
7.	Mitchell	Gilmore

CLASS C—CARS LISTED AT LESS THAN \$1,000.		
No.	Car.	Driver.
19.	Maxwell Junior	Moran
18.	Hupmobile	Keeler
16.	Brush	McKenney
17.	Brush	Huss

*Penalization protested to A. A. A.

MISHAP IN FLAG-TO-FLAG RUN.

EL PASO, TEX., May 19.—On its first day's run into Mexico the flag to flag pathfinder, a Chalmers-Detroit Thirty, had a mishap with a serious accompaniment for its passengers. In laying out the route for an endurance contest from Denver to Mexico City, the car had left this city, crossed the international line, and was 56 miles away when a gear gave way. The car was midway between the two railroads, 46 miles from the nearest, and W. E. McCarton, a passenger walked that distance to catch a train to this city. He left shortly after with food and water for driver William Knipper and photographer F. Ed. Spooner, who had remained with car, without food, and only the water in the radiator to drink. Start was made again this morning.

Automobile Gasoline and Other Available Fuel

Part VI

SPECIFIC HEAT, unlike the latent heat of evaporation, refers to the heat required to raise a given (unit) weight of the elements and compounds through one degree of sensible temperature. Latent heat refers to the evaporation of a liquid, as before explained, and specific heat is involved when the temperature is changed, without changing the state of aggregation. From the point of view of scavenging, which is a condition that follows evaporation and combustion, the specific heat of the products of combustion would have to be taken into account in an attempt to fix the magnitude of the influence of the presence of such products. Assuming that the design is good and that a motor is in proper working order, the allowable compression depends upon several factors as follows:

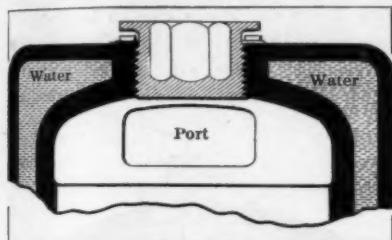


Fig. 27—Inadequate supply of water over combustion chamber is a prolific cause of pre-ignition.

of which gasoline is composed considering its complex character.

(B) The specific heat of the mixture, which will differ as the composition changes, it being the case that all the contents entering into mixtures are not of the same specific heat.

(C) The extent of scavenging and the heat of the spent products of combustion in the absence of complete scavenging.

(D) The temperature of the water in the water-jacket or the efficiency of the air-cooling process if air is used direct for purposes of cooling.

(E) The design of the cylinders and the extent to which the surfaces maintain an even temperature; if some one zone on the surfaces is at a high heat pre-ignition will follow, it being the case that this heated zone will be at the bottom of the trouble, nor does it matter if the zone is of small area. This trouble is most likely in cylinders of relatively large bore, in which the piston is likely to heat up at the axis of the head, which is the greatest distance away from the cooling medium, and it generally is the part in which the heat conductivity is a minimum because the metal is coated with a crust, due to elevated temperature, and the metal in the head is thin in order to have the piston as light as possible.

(F) If the valves are not properly water-jacketed they are likely to heat above the desired temperature and pre-ignition will be due to such over-heat.

(G) In some cases to make the motors as short as possible the water-jacket is so designed that but little of the cooling liquid will circulate over the dome of the combustion chamber, which is just the part that requires the greatest amount of cooling, and pre-ignition will be eminent in all such cases. Fig. 27 shows this construction.

(H) Fins, seams, perturbances, etc., due to defective designing or misplaced cores in the foundry process, will heat up and they will be the direct cause of pre-ignition.

(I) If the water circulation is not good, or if the amount of water circulated is inadequate, pre-ignition will follow. In some cases the water is enabled to short-circuit across from the inlet to the outlet without passing over the hot surfaces and this is a prolific cause of pre-ignition.

(J) Increasing compression tends to increase the terminal pressure, thus allowing and engendering an increase in speed

of the motor without pre-ignition because the conditions of scavenging improves as a result.

(K) Running on a "retarded" spark results in overheating and pre-ignition is likely to follow if the other (remaining) conditions are favorable.

(L) Running on a mixture that is too rich will cause excess heating, which is indicated by a steaming cooler, and pre-ignition is likely to be one of the manifestations.

The Good That Comes from Increasing Compression.—When motors were designed in such a way that compression was not taken advantage of it was found that the power was very feeble and, as before stated, compressing the charge was the greatest stride in the direction of maximum weight efficiency. If the weight efficiency is high the power will be high, for weight of motor and in automobile work as well as in certain other zones, it is desirable to have a high weight efficiency. Under the circumstances it is not wonderful or strange if the question of compression is much discussed, and in view of differences that can follow variations in design it is natural to expect that differences of opinion will creep in.

Some tests were made for the purpose of determining as to the practical limits of compression, using a motor with dimensions as follows:

DIMENSIONS OF MOTOR USED FOR TEST PURPOSES.		
Bore.	Stroke.	H.P. (actual).
4 1/2	5 1/2	32.2

The compression was changed from a maximum of 95 pounds per square inch (absolute) down to 75 pounds per square inch (absolute) without altering the speed that the car was able to make, on a hard level road, with all the other conditions maintained, as nearly as possible, constant. The compression changes were by five pound increments, so that little, if anything, was taken for granted and the observations were carefully made.

What these tests indicated were that losses due to high compression made such inroads on the gains that the net result failed to show any advantage such as would warrant one in accepting the disadvantages. The disadvantages are by way of reduced flexibility, knocking under certain well defined road conditions and far higher depreciation, due to greater strains that will abound in the members that must take the shock. A practical demonstration does not prove everything, but it is worth taking into account and in the light of cold experience this question of compression reaches a limit and if account is taken of the service to be rendered and the happenings in view of service, it may be that the discussion can be simplified and the limit may be placed. In the first place, both from the point of view of abstract theory

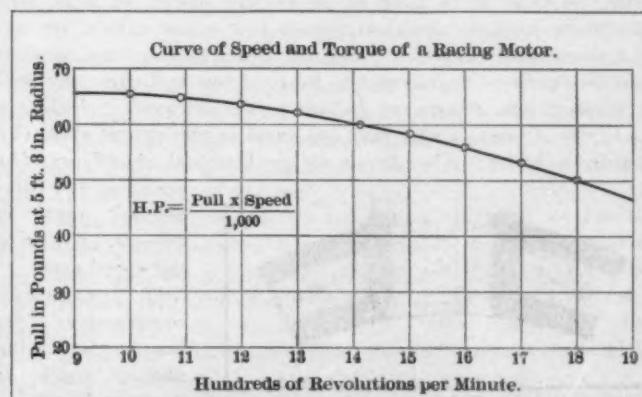


Fig. 28—Curve of speed and corresponding torque of a racing motor depicting high piston speed.

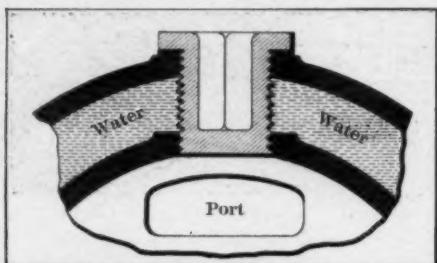


Fig. 29.—Section showing defective cylinder plug allowing water to enter combustion chamber.

sion (on the compression stroke) and unfortunately the mean effective pressure is not increased in direct proportion to the increase in compression.

While it is true that power is lost during the compression stroke, it is equally a fact that power may be gained during the exhaust stroke (indirectly) due to increased compression if the speed can be increased and if the mean effective pressure does not decrease as a result of the conditions that increasing speed may dictate. It has been found in practice that with large valves, high compression and balanced forces, due to good mechanical design and construction, the speed can be very high indeed without suffering a loss of mean effective pressure, so that the power (in such motors) increases directly as the speed up to even 2,000 feet per minute of piston travel, which is double that taken as a basis of the accepted formula.

The accepted formula for horsepower in motors of the conventional (automobile) design is as follows:

Let

$H.P.$ = brake-horsepower of the motor,

d = diameter of the bore of the cylinders in inches,

n = number of cylinders (four-cycle),

k = a constant taken on a basis of 1,000 feet per minute for the piston speed and agreed upon as 2.5.

When

$$H.P. = \frac{d^2 n}{k} = \frac{d^2 n}{2.5}$$

Obviously, at a constant torque, which would be assured were the mean effective pressure to remain a constant, doubling the speed of a motor, which would double the piston travel, would also double the power of the motor. In any attempt to discriminate, then, having in mind the best compression, the mechanical limitations must be uppermost. Having fixed such limits, the area of valves must be taken into account and then it will be proper to estimate the extent to which compression may be increased, having in mind the fuel characteristics. True, the question of cooling and all the other details will have to be favorable, and when everything else is taken into account, the road conditions will have to be kept before the mind's eye.

Of course, a racing car in the hands of a very skilled driver can have many things in its makeup that would scarcely be desirable in a car to be used by an average driver let alone men who know nothing about mechanics and whose minds are not of a mechanical bent. In fixing the compression, then, account must be taken of the service to be rendered and cars may well be divided into classes as follows: (a) Pleasure vehicles in the hands of owners who may not excel in mechanical skill, (b) pleasure vehicles to be driven by professional chauffeurs, (c) taxicabs, (d) commercial cars in general, (e) racing and speed cars.

If increasing compression demands increasing skill to match, as it does, beyond a certain point, the

compression should be a maximum in racing cars, somewhat less for chauffeurs, a good mean for owners of pleasure cars and the minimum for taxicabs and commercial vehicles. This grading is on the assumption that it is good practice to sacrifice power to simplicity in proportion as simplicity taken on a commercial value. Then, there is the question of the roads that increasing compression will make on the net average result, as for illustration the performance of a car on a level hard road will be better than on a grade considering high compression. But this is another way of talking about the power curve (curve of torque) under different conditions of speed. When a motor is rotating at a high rate of speed as will be possible if the car is going on a hard level road, the effect of leakage of compression is minimized and losses to the water-jacket will be the least. As a result the compression pressure will be a maximum and it follows that the combustion pressure will be a maximum also. If so the chances of maximum power are good if the design of the motor is consistent and the strength of parts is adequate.

On a grade if motors slow down the losses due to leakage of compression will be a maximum and the water-jacket will absorb more heat so that the combustion pressure will be lowered, and to compensate for this the driver is nearly sure to adjust the relation of diluting air to gasoline in favor of an over-rich mixture. The motor will then heat up, power will reduce and the end will be knocking, especially toward the end of a long up-hill drive.

Knocking on a long grade may be due to increasing compression, attending decreasing speed, coupled with increasing heat, following a diminishing cooling effect, resultant of the influence of gradient in that the power requirement is a maximum. Under such conditions pre-ignition will be the most likely cause of the knocking, but a small flywheel can influence the situation to a vast extent. Racing motors may be deliberately designed for the conditions such as will assure pre-ignition if on a grade of some length the power requirement is enough to lower the speed of the motor, thus increasing the compression and the heat, as above referred to.

The best way perhaps to illustrate this point is to show a curve of torque under several conditions of speed, using just such a curve as was furnished by a racing motor. Fig. 28 is offered for the purpose, and as will be observed, the best power came at a speed approximating 1,800 revolutions per minute, and since the motor was a four-cylinder, 150-millimeter (square), it follows that the piston travel was:

$$\frac{150}{25.4 \times 12}$$

$F = \frac{50 \times 1,800}{25.4 \times 12} = 1,769.76$ feet per minute
The curve, Fig. 28, shows that the pull in pounds at 1,800 revolutions per minute of the motor was 50 pounds, and since the length of the lever arm of the prony brake (of the balanced type) was 5 feet 3 inches, it follows that the power of the motor was:

$$H.P. = \frac{50 \times 1,800}{1,000} = 90 \text{ horsepower.}$$

The torque of this motor increased with decreasing speed, which is the real matter of the moment, which increase was from 50 to 66 pounds, and the latter figure was noted at 1,000 revolutions per minute. Below this speed the torque fell away, due to leakage, effect of the water-jacket, etc., and it is a plain

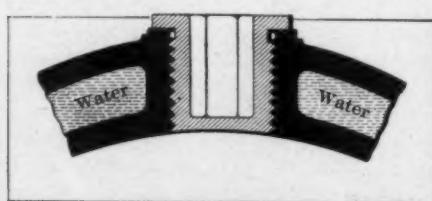


Fig. 30.—More perfect design with enough thread on plug to abort stripping.

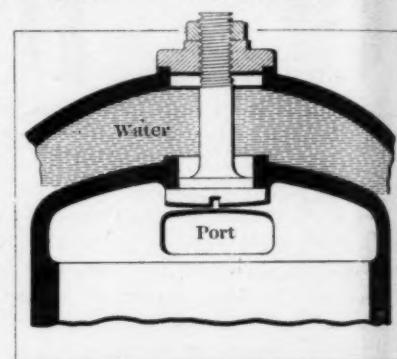


Fig. 31.—Instead of a plug, covers are used, allowing water to reach all surfaces.

deduction that pre-ignition would take place at 1,000 revolutions per minute, which speed would be that due to an overload on a long up-grade, coupled with increasing heat. This would not of necessity be so were the motor of a low compression character considering the performance at the higher speed. In this case the compression was high at the high speed, which would be a fair indication in that the torque was equal to

$$T = 50 \times 5.25 = 262.5 \text{ pounds pull at 1-foot radius.}$$

The mean effective pressure (*M.E.P.*) was:

$$90 \times 33,000$$

$$\frac{M.E.P.}{(5.905^3 \times 0.7854) \times 1,769.6} = 63.3 \text{ pounds per square inch, corresponding to brake-horsepower.}$$

When

$$90 = \text{horsepower (actual),}$$

$$33,000 = \text{foot-pounds per minute for 1 horsepower,}$$

$$5.905 = \text{bore of cylinder in inches,}$$

$$0.7854 = \pi/4,$$

$$1,769.6 = \text{piston travel in feet per minute.}$$

The formula as above gives the *M.E.P.* that is directly assignable to the actual horsepower of the motor, to which must be added such a percentage as will equal to losses in the motor from a mechanical standpoint. If, in a motor of this sort, considering the high speed, the losses are taken as equal to 25 per cent., the real *M.E.P.* would have to be:

$$63.3$$

$$\frac{M.E.P.}{0.75} = 84.4 \text{ pounds per square inch.}$$

$$0.75$$

This phase of the subject is pursued to the extent necessary to bring out the fact that compression must be that which will afford the desired results considering the class of service to be performed by a motor, and it is plain that in a certain class of work it is even an advantage to court pre-ignition. In general service, however, it would be the height of fallacy to design for high compression rather than for acceptable speed, and on the whole it is the right course to consider the speed, such as the motor will thrive under, and fix the fuel compression to conform to the requirements.

Water in Cylinders Makes for Trouble.—Frequently it is found that water passes into cylinders through defects in castings in which slag is enmeshed or due to misplaced cores. In one case that came prominently to the notice of the author a large number of cylinders were so designed that the plug in the cylinder heads failed to satisfy the requirements and water found its way into the cylinders as a result. The defective design is illustrated in Fig. 29 and it will be observed that a plug (bronze) was screwed in, forming the connecting link between the inner and the jacket domes. In service due to differences in heat the thread on the plug stripped at the inner dome and water readily passed into the cylinders.

This problem is serious even when the cylinders are properly designed, but there is small chance of being able to realize much satisfaction from a

motor designed to include the construction as depicted in Fig. 29. Since this is a problem involving the mixture, rather than cooling, it is believed to be proper to discuss it under this head. Fig. 30 shows a modification of the defective plan as indicated in Fig. 29. The plug is screw in all the way and the inner and outer walls of the dome are joined. This is prob-

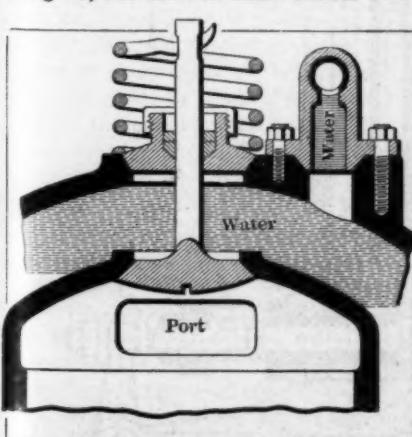


Fig. 32—Differences in expansion compensated for by using springs to hold covers in place.

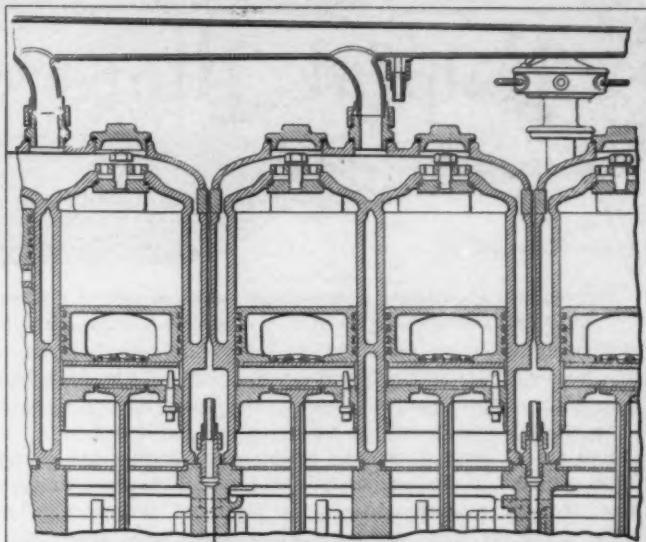


Fig. 33—Section of a Pierce motor showing correct method of providing differences in expansion.

ably a better form of dome than the other, yet even so, it is far from perfect, since it fails to take into account the considerable differences in temperature that must abound at this point in cylinders and the resultant strains.

Still another way to close up the head of cylinders is shown in Fig. 31, many of which have been used, and when the work is well executed this form of cap holds tight to a very satisfactory extent. In this form, as the illustration depicts, a flat-seated, valve-like structure is employed, and a cap is screwed down on the stem to cover the water dome with a nut outside, which is used to tighten the device sufficiently to spring the water dome toward the inner dome, thus bringing a considerable amount of work on the stem. If the stem is not of good material and of adequate section the end will be a leak to the combustion chamber due to elongation of the stem. In this case all joints are ground to a tight fit and once the cylinder is rendered tight if the stem is strong enough to stand the strain the job becomes permanent and tight.

Fig. 32 represents a theory involving the differences due to heat changes, in which the inner and the outer caps are held to their respective seats by means of a strong spring. In this case the stem is not subjected to the strains due to heat, but have to sustain against the pressure of the spring only. The seats are all at an angle of 45 degrees to be ground tight the same as a valve as used in the conventional way.

An excellent plan that works out well in practice and is used on motors of reputation is the one depicted in Fig. 33. In this case the dome of the combustion chamber is absolutely separated from the dome of the water-jacket, and means are provided to maintain each of the covers as tight as the occasion requires, in such a way as to assure entire freedom from all the ills of heat changes. As will be observed, water contacts with the cover over the combustion chamber, and in this way, all the heated surfaces are adequately cooled. The scheme is not complicated, and the cost of doing the work in this way is no bar to its use. The cylinders are cast in pairs, with separate dividing walls, and unequal expansion, which is likely to lead to leakage, with consequent loss of compression, is done away with.

This phase of the subject cannot well be concluded unless to point out that any defect which will let water in will allow the combustion products to escape, and it is a self-evident proposition that the combustion products, if they get into the water system, will soon make an outlet at the expense of the system. The author witnessed just such a case, and the bottom of the water tank was blown out by the force of accumulated pressure thus precluding a road repair.

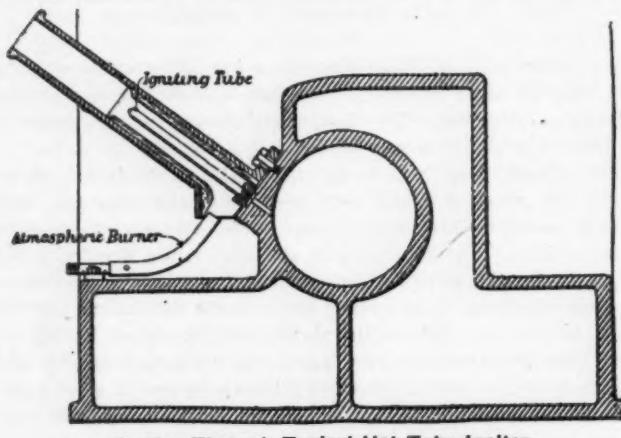
(To be continued.)

Helpful Hints on Ignition Topics

By
Morris A. Hall

THE subject of ignition is one about which much of mystery and secrecy lingers, hence it is a very deep question for the ordinary driver to go into. As an aid to the man learning to drive his own car, and desirous of learning a little something about its component parts, a few of the more important parts of the ignition system will be taken up and explained.

There are in general use two methods of igniting the charge in the cylinder of an engine of the internal combustion type. These are the mechanical and the electrical processes. The former being the least important will be mentioned first.



Section Through Typical Hot Tube Igniter.

It has of itself, two forms, the hot ball and the hot tube. The hot ball takes the form of a ball-shaped piece of metal projecting into the cylinder or closely connected with it. This is intended to be heated by the operation of the engine, and when so heated, gives its heat to igniting the next charge drawn in. So the action is in the nature of a preignition, but the location of the mass of metal is so chosen that the firing of the charge does not take place until the crank has so nearly approached center that a backfire will not take place. To start the engine in the first instance, it is necessary to heat the ball or mass of metal from the exterior, by means of a torch. This takes some time and so the process of starting is an extended one. As a result, the form of ignition is not a popular one, in fact, it is only used on a few stationary engines, which require starting but once a day, or at least not frequently.

In the early forms of automobiles, the hot tube was used extensively, as on the Daimler and the early French collaborators of his time. It consists essentially of an endless or blind tube of platinum or platinum and porcelain combined, which was heated by means of a small and independent flame. This flame is fed through a separate pipe leading to it from the gasoline tank. The heated tube ignites the charge in a somewhat similar manner to the hot ball, with this exception, in some cases, the hot tube is put into and out of communication with the working cylinder by means of a sliding or rotating valve. The latter amplification of this indirect method did much to regulate and improve the method as a whole. It had, however, a number of fundamental drawbacks, which no improvements could eliminate, and it languished. Obstacles to its success were:

(1) It will cause premature ignition when the heated portion is too near the cylinder, and the rest of the tube is clogged with burned or exhaust gas.

(2) It will cause misfiring when it becomes filled with burned

gas, which prevents the fresh fuel in the cylinder coming into contact with the incandescent walls.

(3) It may cause difficulty and possibly misfiring when the wind catches the flame and deflects it from the tube, which then becomes cold and unable to fire the charge.

(4) It may cause trouble through the derangement of or accident to parts of it, as cracked tubes, loose or faulty burners, or deficient fuel supply to the burner.

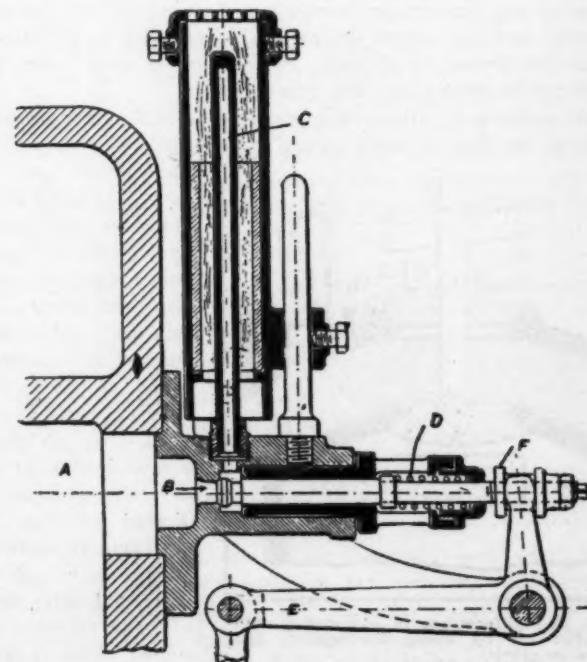
As against all these sources of trouble, the advantages were not numerous enough nor strong enough to save the day.

Self-Ignition by the Heat of Compression.—A secondary method of firing the charge has some of the features of the mechanical way, but in this the fuel is not admitted in the ordinary manner. It is sprayed in at the close of the compression stroke, this acting to compress air only. The act of reducing the volume of the air to a very small quantity increases its temperature to a very high figure. So when the fuel enters, in the form of a spray, it is instantly ignited by the highly heated air and burns rather than explodes.

TABLE I.—Variation of Volume and Temperature with Compression.

Gauge Pressure.	Volume.	Temperature.
0	.100	60
2	.910	80.4
5	.810	106
10	.690	145
20	.543	207
30	.454	252
40	.393	302
50	.350	339
75	.276	420
100	.232	485
115	.213	518
130	.197	550
145	.184	580
160	.172	607
175	.163	632
200	.149	672

This method is not in general use, in fact, it is confined to a single maker, although of late some interest has been aroused in the subject of fuel injection, which carries with it the other



Hot Tube with Mechanical Timing Valve.

matter of self-ignition. The great simplification which it allows will doubtless bring it into favor before long, despite the constructive difficulties.

So, too, catalytic ignition comes really in the same class as the hot-tube method, the main difference being that the heat of compression heats the spongy platinum, which in turn, by catalytic action fires the charge. Like the hot tube, it cannot be closely controlled, but, on the other hand, it has no parts to get out of order and cause trouble.

Electric Ignition Much More General.—All of which leads up to electric ignition, the form in general use, one might almost say in exclusive use, to-day. As with each of the other forms previously mentioned, this type is subject to several subdivisions. The first is into:

(a) Primary electric ignition, and (b) secondary electric ignition.

In the common parlance, these are called low tension and high tension, the former being given the additional name of the make-and-break system, while the latter is more often called the jump-spark system. The latter is, moreover, subdivided again according to the source of current, although for sparking pur-

poses, all sources are alike. These are:

- (a-1) Dry cells.
- (a-2) Storage batteries.
- (a-3) Magnetos or generators.
- (a-4) Small dynamos and all other sources of current.

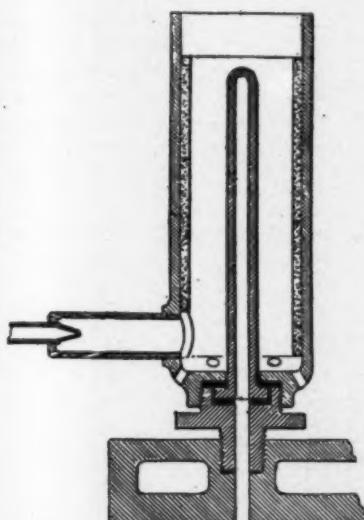
The first, or dry cells, are very generally used on moderate and low-priced cars. They are simple in construction, comparatively simple in operation, and their action is easy to understand. Each cell is composed of three elements: The carbon, the zinc, and the electrolyte. The carbon usually takes the

form of a round stick placed in the center of a cylindrical vessel made of zinc in sheet form. The space between the carbon and the zinc is filled with the electrolyte, generally a solution of sal-ammoniac, which is poured in on crushed coke. The top is closed or rather sealed with pitch to prevent the loss or evaporation of the liquid. Through this, project the ends of the carbon and the zinc, these being formed into binding posts for holding the wires. As this holding of the wires must be an intimate relation, the usual form is a threaded shank upon which a pair of nuts are mounted. Between these the wire to be connected is crushed or compressed by the moving together of the nuts.

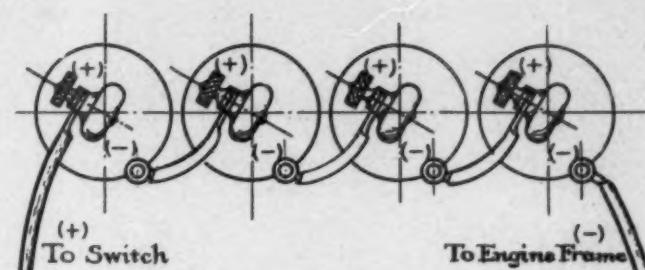
The two poles or binding posts are called the positive and the negative, and are indicated by the + sign for the former and the - sign for the other. Carbon being the positive element, the + sign attaches to it. Now, the act of connecting these terminals together so as to allow a flow of current allows of two different methods of procedure, a right and a wrong way, it is true, but that was not what was meant.

The Two Forms of Battery Connections.—The idea intended was that by varying the mode of connecting the terminals, in one or the other of two ways, the output of the cells may be increased. These two ways are called series connection and multiple or parallel connection. To connect dry batteries in series, the terminals are joined alternately, that is, the zinc of the first is connected to the carbon of the second, the zinc of the second to the carbon of the third, etc.

When so joined, the positive element is left free at one end, and forms the positive terminal of the group, which is then



Porcelain Lining Has a Long Life.



The Ordinary Battery Connection, In Series.

considered as a unit. Similarly, the other free end, the negative, forms the negative terminal of the unit. In this method of connection, the resulting current is the sum of the voltage of all of the cells comprising the group, or expressed otherwise, is the product of the voltage of a single cell times the number of cells. The figure shows how four ordinary small dry batteries are connected in series, which is the ordinary connection.

The other form of connection, the parallel or multiple, differs from the one just given in that the similar terminals are joined together, that is, all of the positives are on one wire. Likewise, all of the negatives are on the other wire. This mode of wiring up the cells gives a smaller output for the group. Thus if the individual batteries have an internal resistance which is low in comparison with the external resistance, the total output will be but slightly more than that of a single cell. If, on the other hand, the internal resistance is high relative to the external, the current will be roughly proportional to the number of cells.

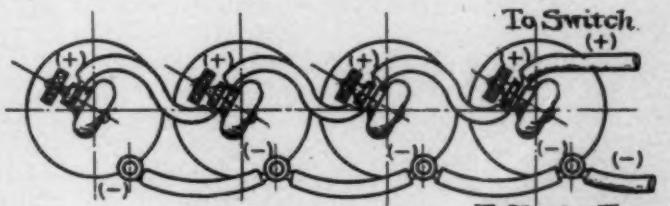
The former is the case so much more than the latter, that it has come to be regarded as a truism that the current from a parallel connection is that of a single cell. A diagram is shown of a set of four dry batteries connected in multiple.

Where the cells are divided into sets or groups of a small number (four is usual), and more than one of these sets are used at a time, there are again two methods of joining them. These two are the same as before, viz., series and multiple. The former is very seldom used, if ever, but the other is rather common. When two or more sets of batteries, themselves connected in series are, as sets, joined in multiple, the whole is spoken of as connected in series-multiple.

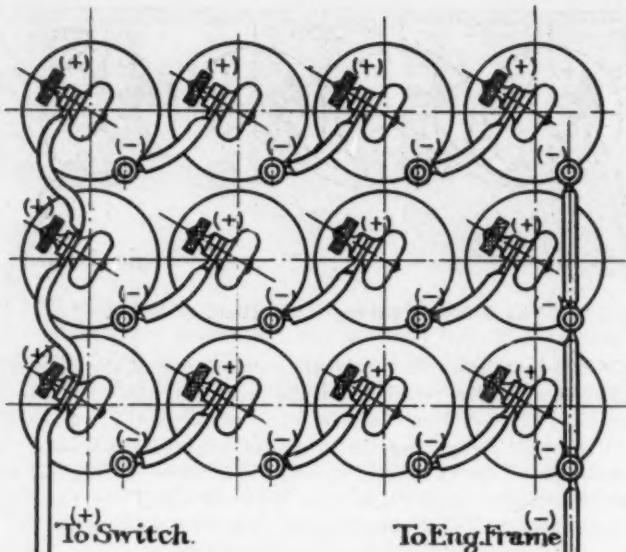
The output from the composite group of many cells is no greater than from any one of the series-connected sets composing it. Usually the voltage of a dry cell is 1 1/4 volts. In multiple, four cells will still give 1 1/4 volts, but in series, the same four will produce $4 \times 1 \frac{1}{4} = 5$ volts. In series-multiple, on the other hand, two, three or more sets of cells of four each will still give but 5 volts. Where then does the advantage of this connection come in, if there is any?

Multiple Series Advantages.—There are a number of advantages of this method, their weight being sufficient to more than overbalance the extra first cost, increased number of connections, and other so-called advantages of the use of the smaller number of batteries connected up in series, so as to produce an equivalent voltage output.

First, there is the greater length of life of the individual cells. To obviate the greater cost (say with twice as many cells it is just twice), the service must last at least twice as long. In fact, it does even better than this. Where four in series lasted but 20 hours, two sets of four each in multiple series lasted 70 hours, which is more than three times as much.



Parallel Connections are Not as Frequently Used.



Three Sets of Cells Connected in Series Multiple.

Second, the cost per hour, mile, or on any unit basis decreases with the number of sets combined in the series-multiple arrangement, for the reason that the working life is greater. If batteries cost the same each, and a connection of eight, in sets of fours, gives a life of three and a half that of the four used alone, it is at once apparent that the cost of service per unit, whatever that unit may be, is reduced to two times one over three and a half, or 4/7.

Third, in common with the two economies of current and consequent cost, as mentioned above, the life of dry cells being carried out to such a great extent, the driver's worry about the state or condition of his ignition current is reduced to a minimum. Given a sufficient number of cells connected in this

manner, it is possible to go through an ordinary season's running without giving the batteries a thought.

The fundamental difference between the dry cell and the wet or storage battery is that one is reversible while the other is not. Although both are chemical actions, that of the dry battery only works in one direction, so that the cell can only give out current until exhausted, after which it must be thrown away and new cells purchased. This is the point which makes the question of the life of dry batteries so important.

In the case of storage batteries, on the other hand, the matter of length of life is not of such grave importance, because the chemical action is a reversible one. So, when the cell has become exhausted and current no longer passes, it is possible to send a current through it, when the reverse action takes place and builds up the drained plates to a point where they are again self-sufficient and able to give off current.

Storage Cells Are More Popular.—For some strange reason, the storage, or, as it is sometimes called, the secondary battery, is more popular than is the very simple dry cell.

The ordinary storage battery is made with lead plates. These may be of two or three kinds, all of which are in daily use. The amalgamated plate has the surface of the lead coated with mercury, which then unites with the lead in such a way that any impurities present in the lead itself are covered while the lead united with the mercury in the form of amalgam is continually presented. The surface presented to the electrolyte is thus always that of pure material, and consequently the chemical action is sustained with equal force right down to the limit of the amount of metal in the plate.

Then there is the pasted plate, so-called because the surface presented to the fluid is composed of material in the form of paste, which has been added to the skeleton form of the grid. This paste is of two kinds, yellow oxide of lead, known as litharge, which is pasted to the negative plates, and red oxide of lead, called minium, pasted to the positive plate. The shape of the grid to which the paste is added, varies greatly.

BORNE IN THESE DAYS WITH AUTO'S RISING TIDE

New Design for an Auto Funeral Car.—An adaptation of an automobile into a funeral car with new features has been patented by J. W. Butler, F. R. Briggs and E. G. Clarke, of Cleveland. In appearance it is unlike that of the usual funeral conveyance, differing only in size from the lines of a standard limousine, but large enough to displace the hearse and five carriages. On the way to a cemetery it is divided into two compartments by a partition, and in inclement weather this may be collapsed and the coach used as a chapel in which to conduct the service at the grave. The inventors have formed the Auto Funeral Car Company, Inc., and will shortly begin the production of the cars.

Dairymen and the Automobile.—At the recent convention in Chicago of dairymen from five States a remarkable situation in respect to the use of automobiles was revealed. Of those attending, 112 were asked as to the use and value of autos to them. It appeared that 38 owned autos, and 11 had more than one machine, mostly used to transport products, but several so equipped that they can operate separators, churning, etc. One runs a bottle washer and another pumps water to flush the dairy barn. Reports showed a steadily increasing interest in automobiles and good roads.

Voters Carried Wholesale to the Polls.—Automobiles have been valued adjuncts to political parties on election days in many parts of the country, the latest section to use them extensively being South Orange, N. J. At the recent election of the Board of Village Trustees 200 cars were pressed into service, and by means of them not a single voter was allowed to go to his place of business until he had cast a ballot.

Combines Duties of Clergyman and Auto Agent.—Rev. Harrison F. Miller, a bookbinder by trade, who resigned from the pastorate of the Chardon, Ohio, Disciple Church recently, has taken the agency for an automobile in that town, and intends to interweave his multitudinous callings. Mr. Miller states that he will not abandon the performance of his ministerial duties, and that in his mercenary pursuits with his touring cars he will be able to have a wider range of influence as a clergyman than ever before.

London Autos with Consciences.—To prevent undue speeding the police of London are contemplating a novel method of procedure, whereby the automobiles will loudly proclaim their movements. Taxicabs and omnibuses may be fitted with whistles, sealed so that they cannot be tampered with, which will be set to give a continuous warning as long as the machines travel at above a certain rate of speed. Thus the conscience of the driver will have more than moral support from his conveyance.

Noted Whip Sells Horses and Buys Autos.—Because automobiles are so numerous that he finds it uncomfortable to drive horses, former Mayor Welling G. Sickel, of Trenton, N. J., one of the most noted whips in the State, has sold his entire string of thoroughbreds, riding, and tally-ho horses. Of course his stables will be turned into a garage.

Trades Auto for House and Lot.—From Salisbury, N. C., comes the latest report of a novel exchange to secure an automobile. Robert Lowder, of Albemarle, wanted a touring car, and J. D. Kennerly, of Salisbury, wanted a house and lot, so the latter gave his \$3,000 touring car to the former in exchange.

In the Driving of a Car

By
D.R. Hobart.

PRONOUNCEDLY prominent are two faults among those possessed by automobilists, and to these must be credited the majority of accidents for which the driver of the car is responsible. The first is that of overconfidence, the average driver considering himself a finished performer as soon as he is able to steer a car with any degree of certainty, and to vary his speed as desired without injuring the machine. As a matter of fact, he is just beginning to qualify as a driver at this stage of the game, as it is only then that he can really give his attention to the road and the conditions of traffic. It is at this stage that the greatest risks are taken, through ignorance in most cases, and even with the knowledge that the chances are greatly against him the overconfident autoist will fly past cross-roads and dodge in between moving trolley cars on slippery rails "on the chance." It has been said that a good scare is the best instructor in wisdom in driving locomotives, and this is true also with regard to automobiles. Once an autoist has run into some other vehicle or been forced to take the ditch to avoid being smashed by a train, he will be more careful about making turns and negotiating railroad crossings in the future. However, the knowledge of driving need not be so acquired, but can be gotten by experience on the road and by avoiding unnecessary risks at all times.

The Fault of "Showy" Driving.—The second fault is that of "showy" driving. A large number of autoists commit this error in taking corners at high speed on two wheels, cutting in in front of another car for the sake of taking a turn ahead of it, coming up to the stopping point at speed and setting the brakes on hard, and similar performances, imagining that such driving shows their skill and causes them to be greatly admired or envied. As a matter of fact, they are not envied nor admired, except, perhaps, for their luck in escaping destruction, but disliked for their lack of consideration for others and because of the danger which they constitute to all road users. Like the overconfident autoist, the showy driver takes crossings at speed, but does so with the full knowledge of what may happen, and is proud of the fact. That driving of this kind is unsafe is shown by the hospital reports, and that it is costly, by the size of the repair and tire bills. A few more plaudits are gained, but when the year's account is footed up the hurrahs come high.

The Question of Speed.—How fast one can travel with safety is a question that each must find out for himself. There are autoists who can drive safely and carefully at the highest speed at which the car can keep on the road, and others who cannot drive five miles an hour with safety. If an autoist is in doubt as to his own maximum safe speed, he would do well to figure it at the limit set down by the laws of the State in which he resides. As this limit is calculated for the majority of autoists in the State, the autoist can be satisfied that it is safe for him to travel at the legal speed, and by not exceeding it, he will be exempt from arrest for fast driving.

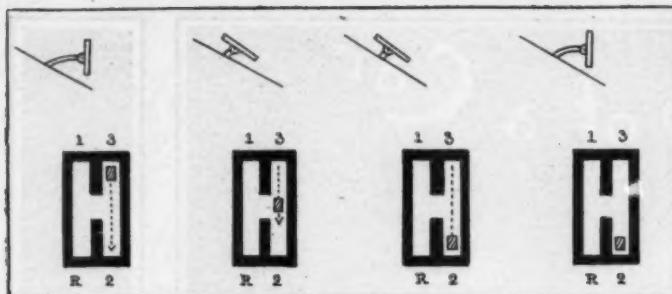
An excellent reason for not driving at speed is the discomfort experienced by the passengers on the rear seats, who are bounced about at every inequality of the road, even on cars with long wheelbases. If any autoist should doubt this, let him occupy one of the seats in the tonneau of a fast-driven automobile for sev-

eral hours and he will be thoroughly convinced. Another reason is the heavy strains to which the machine is subjected at speed tend to shorten its useful life and bring it to the repair shop sooner than necessary.

General Principles to Follow.—When on the open road, away from cities or towns, the following rule should be borne in mind: Drive with moderate speed on the level, slow speed down hill and wide-open throttle for hill climbing or getting up speed only. The condition of the road should be noted, the presence of mud or dust thereon furnishing a sufficient reason for slowing down somewhat for the sake of other road users, and grease, roughness or excessive camber for the sake of the car and its occupants. The ordinary rules of the road regarding the negotiation of turns and crossings and the overtaking or passing of other vehicles should be adhered to even though a lower rate of speed is involved. A sharp lookout should always be kept for traffic of all kinds as well as on approaching schools, churches or public buildings and also for road signs indicating danger, caution, etc. When on the road the autoist should show the same courtesy to other road users as he would if he met them on a city street. Courtesy is much appreciated in autoists and goes a long way toward removing the prejudice against automobiles which exists in many places at present.

Brakes and Their Proper Use.—Next to the motive power in importance come the brakes. There are a number of things that every autoist should know and remember about them, and the first and most important is that brakes vary in their effectiveness from time to time and that the difference between safety and disaster depends on their being kept in good condition and properly adjusted. Another and scarcely less important point is that while a brake may be perfectly satisfactory for slowing down, it by no means follows that it will bring a car to a standstill satisfactorily, nor hold the car from going backward. There is a great temptation to neglect the brakes, both before starting out and when they need setting up on the road, and it is most important that the brakes are tested before starting, and if any adjustment is needed while on the road it should be made at once. The brakes should be tested with the car in motion, the pedal or hand lever being applied until the car slows down and stops. The distance traversed in making this test should be noted and a greater distance allowed in making stops on the road. In applying brakes, the application should be gradual, reducing the speed of the car as quickly as possible, but not locking the wheels. As long as the tires retain their grip on the road, the powerful retarding action of the brakes on the car continues, but when the wheels are locked the brakes have little or no effect and the car will either slide along or skid, in either case being out of control of the driver. If the wheels become locked while descending a hill the brakes should be released until the wheels are again revolving and then reapplied gradually, when they will act satisfactorily.

Proper Procedure in Gear Changing.—In changing gears the autoist should endeavor to have the motor and car moving at nearly corresponding rates of speed before the clutch is engaged. With the planetary type of gear, changing is simple, and



Changing Down from Third to Second Speed.

drivers usually guess at the proper period at which to make the change, any mistake in estimating the rates of the car and motor being of little consequence, as the bands will slip instead of transmitting the shock to the gear. A similar action occurs in the case of individual clutch or friction gears, but with the sliding type severe strains and shocks have to be taken up by the clutch and are usually transmitted in part to the gear if the clutch is not slipped. What applies to the sliding type in general applies to the other types as well.

Changing from a Lower to a Higher Gear.—In changing from a lower to a higher gear it will be necessary to speed up the motor by means of the throttle or accelerator in order to store enough energy in the flywheel to furnish the work needed to accelerate the car to its new speed. As the speed of the car increases the higher gear should be engaged, the autoist not being in too great a hurry to make the change. The movement of the change gear lever should be made quickly in order that the car does not lose way. When changing from a higher to a lower gear the change should be made as quickly as possible before the car has time to slow down. When climbing a steep hill it should be ascended as far as possible on the high gear by proper use of the throttle and spark, and the change down to the lower gear made as soon as the motor begins to labor or is in danger of stopping. The presence of an unusual number of passengers in the car will affect its ability to negotiate grades which ordinarily are taken on the high gear, and the autoist should remember this and not attempt to force the car to travel on that gear with the increased load, but resort to a lower gear.

Changing with Selective Gearing.—Of the two chief varieties of sliding gear the selective is in most common use. The most familiar form employs a sort of grid with communication between the two slots through a gate or passage cut in the bar at right angles to the slots. A lever works backward or forward in either of these slots and can be shifted from one to the other through the communicating gate. The ends of the slots represent the positions of the lever when certain gears are engaged, and in the illustration the lever is seen with the third or high gear in mesh. For changing from third to second gear the procedure is shown graphically. The first position is with the clutch engaged and the gear lever in third gear position, the clutch being shown above the grid. The second position shows the clutch disengaged and the lever being moved toward the second gear position marked 2 on the grid. The third shows the lever in second gear position and the fourth, the final step in the change, the clutch again engaged. The procedure is the same in the case of a progressive sliding gear.

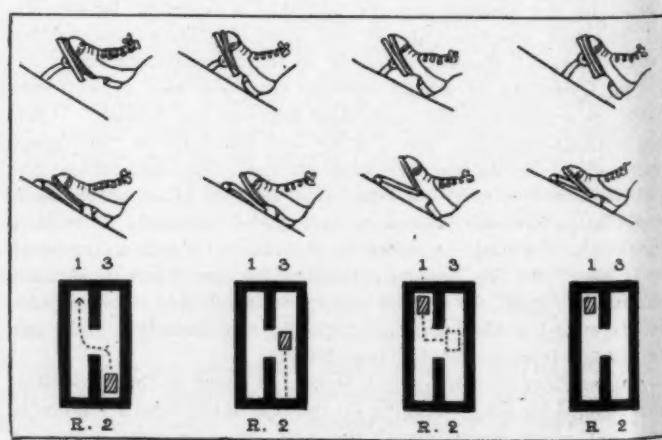
Changing from Second to First Gear.—The second figure shows the change from second to first gear on the same grid. The upper line of figures shows the movement of the clutch pedal and the central line the corresponding movement of the accelerator or throttle. The first position shows the clutch in and the throttle open ready for the change. The second shows the clutch withdrawn and the lever moved along the slot until opposite the gate. The third shows the lever being moved through the gate and along the other slot toward the first gear position, this sideways and forward movement being combined in one continuous movement. The motor having speeded up as soon as the clutch is released, it is necessary to reduce its speed

somewhat before engaging the second gear, so the accelerator is shown partially released in this position. The gear is then engaged, the clutch let in and the accelerator again depressed, which is the situation shown in the fourth position. A change from first to second is made in the reverse order, except that the accelerator pedal is not released unless it is necessary.

Use of the Spark.—Upon the proper use of the sparking device depends the economy of the motor, and in many cases the safety of the driver. On some cars the sparking point on the magneto is fixed, and the autoist controls the car by the throttle only. There are a number of cars in use which employ the battery in connection with separate coils or a single spark system, or a magneto on which the spark can be regulated by the driver. When starting, the spark should be retarded in the case of battery ignition to prevent backfiring, and slightly advanced to a certain point, depending on the motor and magneto, in the case of magneto ignition. When it is desired to slow the motor down below the point obtained by throttling only, the spark is likewise retarded. In ordinary running, a position of the spark lever can be found which will give fair average results through a considerable range of speed without changing its position, and this position varies with each motor and can be found by experience. When a higher rate of speed is desired, the throttle is opened and the spark advanced gradually. If a grade is to be negotiated it should be "rushed" if possible, the throttle being opened full and the spark well advanced until the motor begins to slow down and "knock," when the spark should be retarded to correct this. The autoist should always keep the spark as far advanced as possible, without causing the motor to knock. When accelerating or retarding the spark should follow the throttle, the latter always being operated first.

Driving at a Constant Speed.—One of the best lessons in the proper method of driving a car is that of driving at a constant speed, no matter what the road conditions. The autoist should previously determine a speed compatible with the nature of all roads over which the car is to pass, and should see that the speedometer hand keeps at the determined speed throughout, regulating the spark and throttle and changing gears if necessary. Considerably more will be learned about the flexibility and power of the motor in driving in this way for a few times in numerous drives in the ordinary way.

Reversing Is Usually Neglected.—Among other things connected with driving which is apt to be neglected is reversing or driving a car backward. Usually a car is never reversed for more than a few yards at a time and the maneuvering involved requires no great skill. Steering a car when running backwards is diametrically opposite to that when running forward. A turn of the wheel to the left steers the car in the opposite direction to the right, and vice versa. The usual mistake made in reversing is in turning the steering wheel too far and describing zig-zags in the road as a result. The autoist should remember that the reverse gear of a sliding change gear should never be engaged until the car has been brought to a full stop.



Changing Down from Second to First Speed.

Pointers on the Care of Vehicle Batteries

By Howard Greene

At least once a week the battery cells should be flushed. That is, clean cold water should be added, if necessary to bring the electrolyte, as the liquid is called, half an inch above the tops of the plates. This should be done before charging, so that water will become thoroughly mixed with the electrolyte. If it is found that an individual cell repeatedly requires considerably more flushing than the others, look carefully for the reason. There may be a slow leak in the jar, in which case there will probably be a wet spot under the cell. Some internal trouble may cause the cell to heat and the water to evaporate more rapidly than from the other cells. In case of a leak, the continued addition of water will bring down the gravity of the sulphuric acid, or whatever liquid is used, and in case of internal heating, the temperature of the cell will give the necessary warning. In either case, the cell should come out and go to the expert.

Care to be Used or Destruction Results.—To continue using a cell that heats, or one that leaks, is to invite the destruction of that cell and delay on the road. This is a continuous performance, that is, the hotter the cell becomes, the more rapid the evaporation, and the lower the level of the electrolyte will fall; the lower the electrolyte falls in the cell, the hotter it will get. The electrolyte soon falls so low that current cannot be forced through, and the vehicle will be brought to a stop. When this occurs, the cell will be found steaming hot, the plates in a sad condition, the separators destroyed and very likely the jar cracked from the heat. A cell that has gone through this experience can be made useful again only by a long course of tender nursing, or it may be completely ruined.

If a jar springs a leak and it is not possible to replace it with a new one for some time, cut the connections to the adjoining cells with a "plumber's saw" and lift the elements from the jar, putting them, if possible, into a vessel of electrolyte or, at least, into clean cold water. Leave the old jar in place as a space filler, or else fill in with a wooden form of the right size and shape. Connect across the space by burning in a lead strap or, if this cannot be done, by a heavy copper wire secured to the strap ends with brass screws and washers. Lose no time in having repairs made. Have the cell fully charged before cutting it out. If the elements are placed in electrolyte, put the fluid in a glass, wood or hard rubber vessel, as the acid has a vigorous corrosive action on metals other than lead. In any case, make sure that there is no metallic connection between the plates.

Beware of Loose Connections.—A loose or imperfect connection anywhere about the battery is apt to cause trouble which may become serious. The resistance established thereby to the passage of the current causes the loss of just so much energy, and, furthermore, the overcoming of the resistance is accompanied by heat. If the resistance is sufficient, the heat may become so great as to cause the fusion of the conductor at the faulty contact. The heating power of the current, from even a moderate sized vehicle battery, is surprising to one unfamiliar with such matters. A film of oil, between surfaces that should be in contact, can do damage very quickly. The heat carbonizes the oil and the carbon grows extremely hot until finally the metal melts when a heavy current passes. Consequently, one should see that all separable connections are kept clean and bright at the contact surfaces.

Look Out for Local Short Circuits.—If a strap breaks while the battery is delivering a heavy current, it is possible that there may be fusion of the lead at the point of fracture, and that particles of the loose metal may fall into the bottom of

the cell and cause local short-circuiting and heating. This possibility should be taken into consideration if a cell which previously gave no trouble shows a tendency to heat after a broken connecting strap has been re-burned. It is also possible that a careless burner may have allowed lead scrapings or particles of molten lead to fall among the plates, with the same result. Such carelessness is, of course, inexcusable.

A very low temperature—below freezing—will reduce the capacity of the battery and also its voltage, although both will recover as the temperature rises and there will be no permanent damage. The battery should be kept, when not on the road, in a place where the temperature does not fall very low. The temperature at which a battery works best is about the same as that most comfortable for the driver.

In course of time the active material in the plates becomes disintegrated and falls to the bottom of the jars. If allowed to continue long enough, the deposited paste or free metal would reach the bottom edges of the plates, which are sometimes supported on ribs rising from the floors of the pans on purpose to keep them clear of this sediment. When there is only a quarter of an inch between the top of sediment and the bottom of plates, the jars must be cleaned. In order to ascertain when it will be necessary to clean a battery, one pair of straps is disconnected and the plates lifted out of the jar, permitting the depth of the deposit to be measured, after the battery has been charged, say, 50 times, or has worked 50 days. Suppose the ribs are $1\frac{3}{4}$ inches and there is sediment of half an inch.

Rate of Deposition Indicates Time for Cleaning.—Clearly at the same rate the sediment would be $1\frac{1}{2}$ inches deep, or within a quarter of an inch of the plates, after 100 more charges; but, as the plates grow older the rate increases, and it is usual to allow for a 20 per cent. increase. This would make it necessary to clean the battery after a total of 120 charges—50 before examination of the single cell and 70 afterward. The cleaning should be done by an expert, who will at the same time examine the whole battery carefully and take the opportunity to do whatever other work is necessary.

Every precaution should be taken to prevent dust, dirt or foreign matter of any kind from getting into the cells. When in place in the vehicle the battery should be thoroughly protected from rain and snow, or there will be, perhaps, a weakening of the electrolyte that will be difficult to account for. Keep the exterior of the battery as clean and dry as possible, and the trouble will be well repaid.

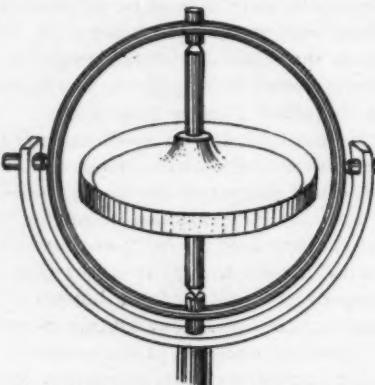
Electrolyte will burn its way rapidly through cloth, and one may as well say farewell to any clothes used when working steadily about batteries. If acid is splashed on clothes that are wanted for further use, put ammonia, sal soda and water—or, if these are not at hand, plenty of clean cold water—on the places and disaster will be averted. Acid will make the skin of the hands dry and harsh; the remedy is to wash them in glycerine in the evening. If the acid gets into a cut or scratch, it will instantly make its presence felt by the sharp stinging that will follow. Cold water will stop this at once.

In conclusion, it may be emphasized that it is not worth while, even from the point of view of a lazy man, to postpone giving to a battery the attention it requires. The trouble will wait, and very likely will improve the time by multiplying itself, so that an hour saved this week may stretch out until it becomes a day's work next time. The effect on the owner's pocket may be even more marked, for time is money, and money spent for repairs, that could just as well have been avoided without expense, makes a great deal of noise sometimes.

The Flywheel as a Gyroscope

By Henry M. Russell, Jr.

NUMEROUS opinions have been expressed from time to time on the gyroscopic action of the fly-wheel of an automobile and various advantages are claimed for certain cars in which the fly-wheel is placed in an unusual position. In claiming these advantages, comparison is made with the Schlick gyroscope to prevent rolling in vessels and the Brennen mono-rail car. In these comparisons the fact has apparently been lost sight of that the conditions upon which the operation of the last named devices depend do not exist in an ordinary automobile.



The Gyroscope Top is Well Known.

free to rotate in the second plane, then the effect will be to rotate the axis in the first plane, precisely as if the fly-wheel were not spinning about the axis except for resistance due to friction.

These are the laws of the gyroscope, the common impression to the contrary notwithstanding. For example, if a fly-wheel is spinning about a horizontal axis and we attempt to raise one end of the axis, it will tend to rotate in a horizontal plane, the direction of the rotation depending upon which way the fly-wheel is spinning about its axis. If it is free to rotate in the horizontal plane, the apparent effect will be resistance to the force applied. If it is not free to rotate in a horizontal plane then we shall be able to raise the end of the axis exactly as if the fly-wheel were at rest, except for friction in the bearings. As the forces are large this friction may be considerable and it has undoubtedly led many experimentors who neglected this point to erroneous conclusions.

No Gyroscopic Effect with Common Position.—With the fly-wheel as commonly placed there can of course be no gyroscopic effect which would tend to turn the car over sideways since the bearings will not transmit any force in this direction. The only possible effects are that if the front wheels be raised by an obstruction the car will tend to change its course to one side or the other, depending on the direction of the rotation of the fly-wheel. This effect is probably negligible. Conversely, when a car rounds a curve the gyroscopic action will tend to lift or depress the front wheels according as the curve is right or left handed. This effect is probably small but may help sometimes in making a car skid by lessening the pressure on the front wheels.

Turning now to the cars in which a fly-wheel placed horizontally and revolving about a vertical axis is supposed to prevent the car from over-turning sideways, we find that the conditions are fundamentally different from those of the Schlick and Brennen applications of the gyroscope. In these applications both in the boat and the train the rotating wheel is so hung that its axis can turn in a fore and aft plane independently

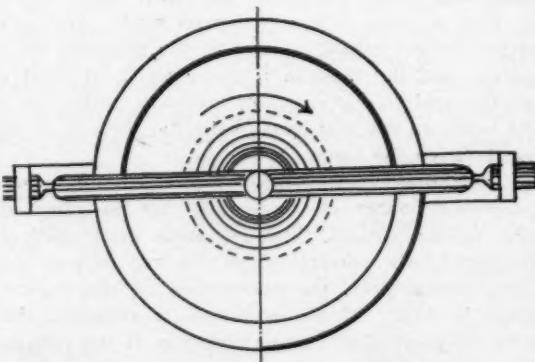
of the rest of the vehicle. It is upon this that their action depends, and in its absence there will be no gyroscope effect.

Herr Schlick in one of his papers expressly states that if the axis were fixed with respect to the hull of the vessel, the only effect would be to lengthen the period of rolling without decreasing the amplitude. This may be shown from theoretical considerations, but was proved experimentally on Schlick's boat. The axis is and must be fixed with respect to the frame of an automobile because of the necessity of transmitting the power to the wheels. The only effect therefore of the gyroscopic action would be to lengthen the period of rolling and not to prevent the car from upsetting.

Action of the Gyroscope of a Curve.—In turning a curve, in one direction the pressure on the front wheels would be increased and in the other directions it would be diminished, depending on the direction of the rotation of the fly-wheel. The converse of this would also be true, that is, if we lift the front wheels the gyroscopic force produced will tend to turn the car over sideways; now it might very well happen that the front wheels would meet an obstruction while the car was rounding a curve and if the curve happened to be in the right direction the gyroscopic force would be added to the centrifugal force due to the curve and would actually increase the liability to upset the car on turning the curve.

Since these conditions would undoubtedly occur sometimes it may be said that the placing of a fly-wheel horizontally instead of decreasing the danger of upsetting sideways would increase the danger of such an accident eventually happening. The writer does not know whether the forces developed at ordinary speeds would be great enough to make any particular difference but the makers of the horizontal fly-wheel cars evidently believe that the forces are worth taking into account, so we may assume this in our discussion of the question.

It would of course be possible to mount the motor and its fly-wheel so that they could swing in a longitudinal plane as Schlick and Brennen do, and then of course the effect would be



Top View of the Gyroscope, Showing Rotary Action.

to prevent upsetting and we would even be able to run on two wheels. The writer believes that such a car has been built as an experiment, but none of the cars on the American market have, so far as he knows, adopted this plan and, as at present constructed, the horizontal fly-wheel increases instead of decreases the chance of the cars sometime upsetting when rounding a curve. Interested readers are referred also to the Jan. 16 and Feb. 20 issues, *The Automobile* for 1908.

Letters Interesting and Instructive

AUTO SIGNALING CODE.

Editor THE AUTOMOBILE:

[1,882.]—Having read the article in "The Automobile" of March 18 on the use of the horn or gong for a signal code (No. 1,795), I am pleased to say that the signal code which I will describe herein has been used by me for the past several years, and is the combination of lumbermen's and steamers' signals with no variations, and with the addition of using train signals.

- (1) When running ahead and going to make port, or to stop. One long and one short blast of horn, to be sounded not less than 30 yards from point of stopping. One short blast.
- (2) When coming to a standstill, or have made port. One short blast.
- (3) Going to start ahead, or leave port. Two short blasts.
- (4) When standing still and going to back up. Three short blasts.
- (5) Starting ahead slow on bad roads, slippery or muddy. Four short blasts.
- (6) Going to turn to left at road crossing, to be sounded before starting to turn. Two short and one long blast.
- (7) Going to turn to right at road crossing. One long blast.
- (8) In passing a slower car on port side (left). One long and one short blast.
- (9) In passing when abreast on port side. Two long and two short blasts.
- (10) When crossing intersecting roads, signal must be blown at least 20 yards distant from crossing. (Port) One long blast. (Starboard) Two long blasts.
- (11) Coming to forks of road, if any, cars, teams, vehicles coming in opposition use marine signal code; will turn to left; always keep on right side of roadway. Five long blasts.
- (12) Calling for assistance, if stalled on the road.

In saluting other machines and occupants courtesy must be respectfully paid by proper use of horn. Any amount of noise will not do, as it would be confusing to other autoists. Several quick sharp blasts of horn will do. Blowing of horn unnecessarily is deemed undesirable by the best autoists.

I have not seen any signals in a comprehensive form printed yet, and if these signals have been printed before in any magazine, I have not come across them.

Since 1903 I have been reading your magazine, "The Automobile," and several others, not being a regular subscriber, as I travel on the continent quite a bit, but now I will be at the Seattle A. Y. P. E. for the season of 1909, and I buy "The Automobile" at newsstands generally.

Hoping that the signals as used are easily understood by anyone.

COUNT JOHANN VON BUTALA.
Seattle, Wash.

We give the letter and code in full above, but would make the criticism that there are three pairs of signals, which are alike, and while it would appear that there is no danger of their conflicting with each other, it would be best to have different signals for the present duplicates. So we are suggesting changing three of the above as follows:

- (3) From one short to five short.
- (9) From one long and one short to one

short and one long, a transposition.

(11) From one long to three long or possibly it would be better to leave this as it is and change

- (8) From one long to three long.

TIMING OFFSET CRANKSHAFT.

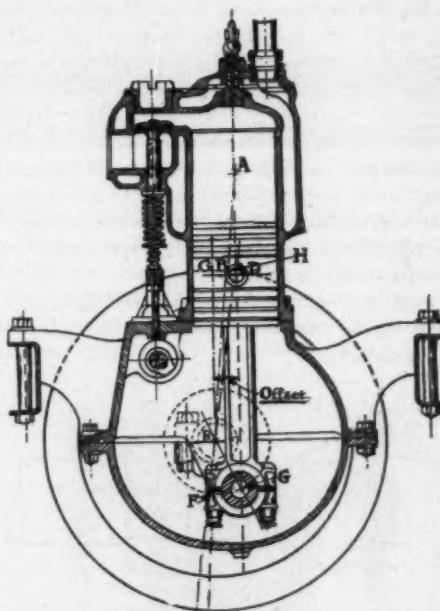
Editor THE AUTOMOBILE:

[1,883.]—Will you please tell me how to time an engine with an offset crankshaft?

A. E. MOORE.

Haverhill, Mass.

To time an engine having an offset crankshaft, the inclination of the axis of the con-



Section Through Engine with Offset Crank

nected rod must be taken into account. As the figure shows, the connecting rod is vertical, and if the shaft center were not *de sare*, the flywheel would be marked at the exact center of the upper face, namely at C. In the case where the center is set over, the rod, when in a vertical position as at G is not at the end of its stroke. If the flywheel were marked at C it would

not indicate correctly the lower dead center. This does not appear until the three centers, piston pin, crank pin, and crankshaft are in line, as shown by the line D E F. The flywheel should be marked at this point, and the mark may be on a vertical line through the crankshaft center or on a diagonal as the line just indicated. In the latter instance, the mark for the lower center would be at H.

Similarly, the upper dead center, if marked, would be at a vertical point above the shaft center as C, but would assume a different position, located on a diagonal, as at A, on the center line A B E.

Of course in actual timing, the upper and lower centers are not used, as good practice decrees an overlap for the valve action, but they have been used as an illustration in this case because their use simplifies the matter.

In the second figure, at the bottom of the page, the actual marking of a flywheel is shown for a complete cycle. In this the angles selected follow the best modern practice, being as follows: Inlet opens at 8 degrees past the upper center, and closes at 26 past the lower center, giving an inlet opening, total, of 198 degrees. Exhaust opens at 46 degrees before the lower center and closes at 5 past the upper. This gives the whole angle for the exhaust, 231 degrees on the crankshaft.

As shown, the markings are put on the flywheel directly above the center of the crankshaft, but the offset is taken into account.

CHEMICAL RECTIFIERS.

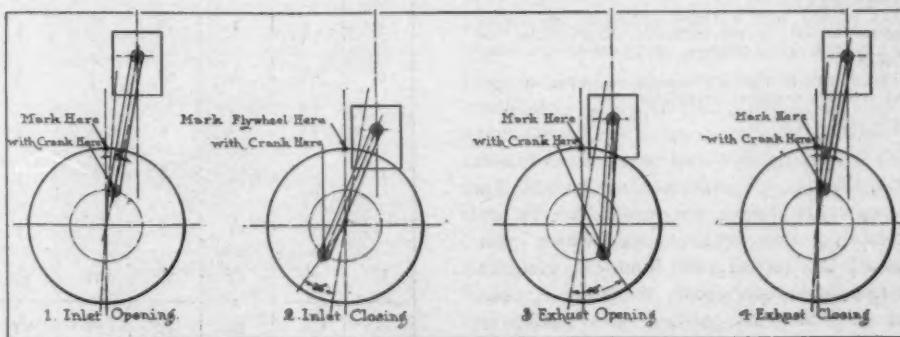
Editor THE AUTOMOBILE:

[1,884.]—Can you inform me of the name of the chemical or chemicals used in a corrector or rectifier for transforming alternating to direct current for charging of ignition batteries? The chemical I have reference to is of a crystal form, looking somewhat like borax. If you or any of your readers can tell me this, I would very much appreciate it.

B. M. JEWETT.

Claremont, N. H.

Of course we cannot be sure of the exact chemical which you have reference to, as



Diagrams Showing the Four Positions of the Offset Crankshaft.

May 20, 1909.

May 20

a number of them are in use. Thus, if you use an aluminum-lead rectifier, the electrolyte may vary. This variation also affects the voltage of the current which may be higher with one electrolyte than with another. Dilute sulphuric acid will not allow the use of higher voltages than 20, while with potassium or sodium phosphate, as high as 200 can be handled. Ammonium phosphate raises the figure to one that allows of converting the ordinary electric light circuit of 220 volts. With a 110-volt circuit, a saturated solution of common baking soda can be utilized.

In practice, two of the aluminum-lead cells are placed in series, and there are two pairs of cells, one working with each half of the current. These are coupled in such a way that the whole current passes in the same direction through the accumulators to be charged. These cells have a very high internal resistance, and the lamp resistance ordinarily used must be passed through lamps intended for a current 20 volts below the ordinary to allow for the drop due to the internal resistance.

The mercury rectifier is more commonly used and a very complete description of one of these will be found on page 344, of THE AUTOMOBILE, issue of February 25.

HYDROMETER DESCRIPTION.

Editor THE AUTOMOBILE:

[1,885.]—In recent articles in "The Automobile" I have often seen the word hydrometer used; will you please describe this instrument and its functions?

J. M. STEELE.

Tekonsha, Mich.

The hydrometer is an instrument for measuring the specific gravity of liquids, in other words, the density. It is an instrument resembling a thermometer with a large bulb on the bottom. The latter is filled with lead, mercury, or other very heavy substance, placed in there to make the instrument sink into the liquid even when thick and heavy. In the issue of April 8, THE AUTOMOBILE, several hydrometers are shown in position in liquids which are being tested. These will show you both the instrument itself and its use.

ON A VARIETY OF SUBJECTS.

Editor THE AUTOMOBILE:

[1,886.]—Will you please answer the following questions for me:

(1) What is the record for a bicycle, on a straightaway?

(2) Would not a three-cylinder two-cycle engine equal a six-cylinder four-cycle, as far as the smoothness of running is concerned?

(3) What is the difference between a low and a high-tension magneto?

L. E. HOWE.

Liberty, Ind.

(1) You do not say what record you wish, that is, the question is too broad. To get an exact answer you would have to say definitely: the distance for which you wanted the record; the kind of rider, as amateur or professional; the kind of contest in which the record was made, as handicap or open race; whether in actual competition or against time; and if the lat-

ter, whether paced or unpaced; and if paced, whether ordinary or motor pace was used.

(2) Yes, a three-cylinder, two-cycle engine would run as smoothly as a six-cylinder, four-cycle. For equal size, it would not deliver as much power, and probably would consume more fuel.

(3) The difference between the two types of magneto is that they generate two entirely different kinds of current. Thus, the true high tension magneto will produce a high-tension current, the armature windings being such as to give this result. The low-tension machine, on the other hand is designed and wound so as to give a low-tension current. Under no consideration whatever can the high-tension machine be used for purposes where low-tension current is desired or necessary. The reverse of this does not hold, in fact, a number of ignition systems employ a low-tension magneto, the current from which is intensified by means of a coil, the resultant product being a high-tension current.

The difference in the use of the two forms of current lies in the fact that with high tension, the momentary intensity of the current is such as to jump a large air gap, as in the ordinary spark plug. With the low tension current, on the other hand, this does not hold and the current must be mechanically broken.

The devices for doing this are numerous and varied, too much so for a description here.

CYLINDER THICKNESSES.

Editor THE AUTOMOBILE:

[1,887.]—Will you please give me an empirical formula for figuring the thickness of cylinder walls for gasoline engines as used in automobiles? T. H. HEATH.

Buffalo, N. Y.

Thurston gives

$$T = aP \frac{m}{d} + b$$

in which T is the desired thickness, and a is a constant, for vertical cylinders the value of which is .0004, and for horizontal cylinders .0005. b is also a constant, with the value .2 for vertical and .5 for horizontal. P_m is the maximum pressure in pounds per square inch, and d is the diameter of the cylinder. Lucke gives $T = .075d$, and for cylinders above six inches in diameter $T = .075d + .3$. Rice compiled from

p D

current practice, $T = \frac{1}{16}$ inch for 5300

light automobile practice, which takes into account the average maximum internal explosion pressure.

FINE SCREW THREADS.

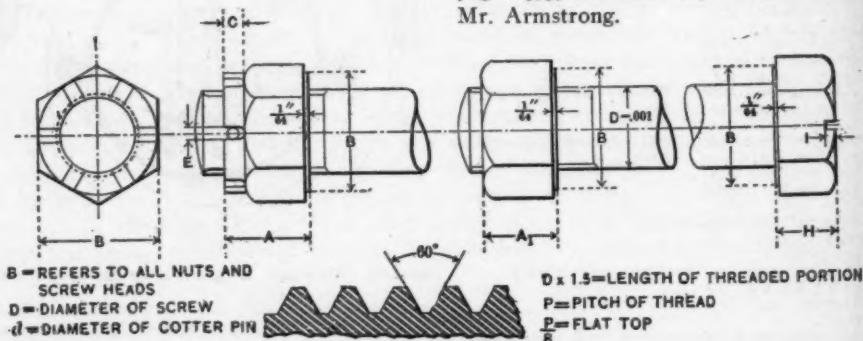
Editor THE AUTOMOBILE:

[1,888.]—I notice in the April 22 issue that fine screw threads have been standardized. Will you please publish the table of these as now standard? I have been waiting for this for many years and I believe that it would be of interest to many readers.

C. V. ARMSTRONG.

Fulton, N. Y.

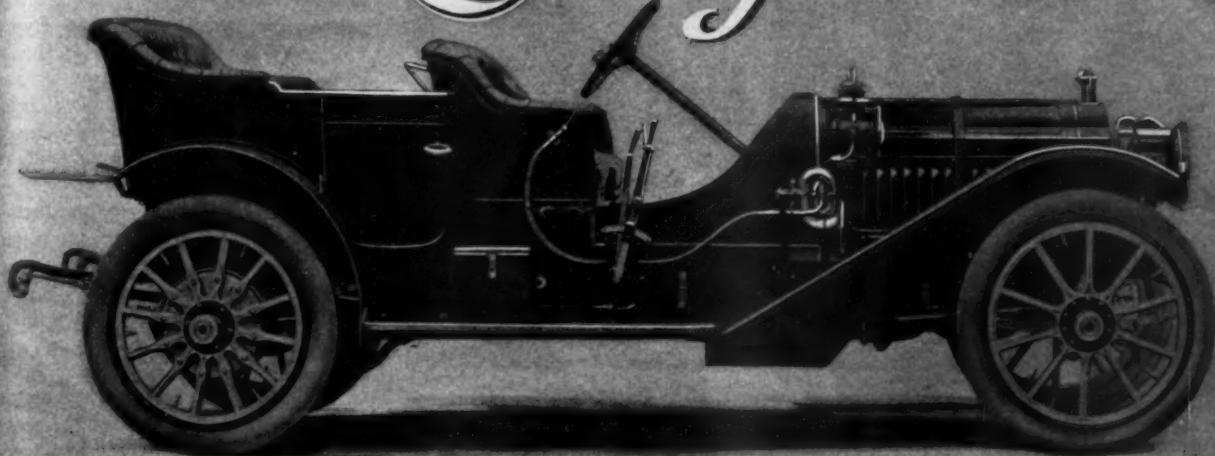
Although this table has been published before, we reproduce it herewith as taken from the "Automobile Trade Directory," pages 599, 600 and 602, for the benefit of Mr. Armstrong.



D	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{1}{2}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
P	28	24	24	20	20	18	18	16	16	16	14	14				
A	$\frac{9}{16}$	$\frac{11}{16}$	$\frac{13}{16}$	$\frac{15}{16}$	$\frac{17}{16}$	$\frac{19}{16}$	$\frac{21}{16}$	$\frac{23}{16}$	$\frac{25}{16}$	$\frac{27}{16}$	$\frac{29}{16}$	$\frac{31}{16}$	$\frac{33}{16}$	$\frac{35}{16}$	$\frac{37}{16}$	1
A ₁	$\frac{7}{16}$	$\frac{9}{16}$	$\frac{11}{16}$	$\frac{13}{16}$	$\frac{15}{16}$	$\frac{17}{16}$	$\frac{19}{16}$	$\frac{21}{16}$	$\frac{23}{16}$	$\frac{25}{16}$	$\frac{27}{16}$	$\frac{29}{16}$	$\frac{31}{16}$	$\frac{33}{16}$	$\frac{35}{16}$	$\frac{37}{16}$
B	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{16}$
C	$\frac{3}{16}$	$\frac{5}{16}$	$\frac{1}{2}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{16}$
E	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$
H	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$
I	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$
K	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$
J	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$

Table of A. L. A. M. Standardized Fine Screw Threads.

Packard's Cars for 1910



Latest Type of Packard "Thirty," Showing New Phaeton Body.

HAVING just completed the scheduled number of cars for the 1909 season nine days ahead of the time limit set, the Packard Motor Car Company of Detroit, Mich., is now announcing the details of the models upon which it will concentrate the energy of the enormous plant on the Boulevard for the coming year. This does not include any radical features, but is on the order of a continuance of its previous policy of confinement to a single quality product, in two sizes. These are the well-known "Thirty" and "Eighteen."

An examination of the appended details shows that the only very noticeable change is in the clutch, the type of which is a radical departure from previous Packard practice. Otherwise, the changes are all in the nature of small refinements, rendered advisable in the light of an additional year's experience.

The 1910 Packard "Thirty" may be obtained as the standard seven-passenger touring car, as a runabout, a limousine, a landau, with close-coupled body or with the new phaeton body. The latter body has been introduced as a practical vehicle meeting the demand for a fast, powerful car with low seats and small tonneau. The "Eighteen" is supplied as the standard five-passenger open car, a runabout, a limousine, or a landau. Both cars are the same in design and construction, the essential differences being in size.

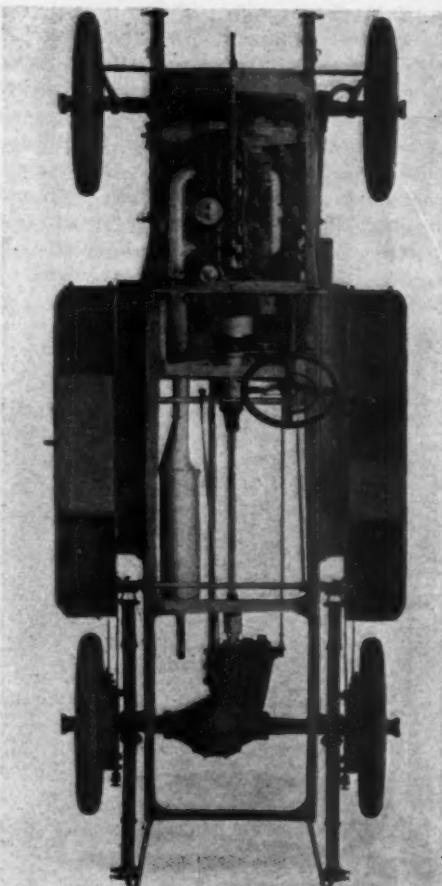
The chief features in which the 1910 Packard differs from the 1909, apply equally well to the "Eighteen" as the "Thirty." Those who are familiar with the car and the company's long-established policy, know that each successive model, instead of being a radical departure from the preceding one, is, instead, a careful development of it. Consequently, the engineering work, and the improvements each succeeding year, have reached a

stage where the development comprehends even the most trivial feature of the car, tending toward mechanical refinement.

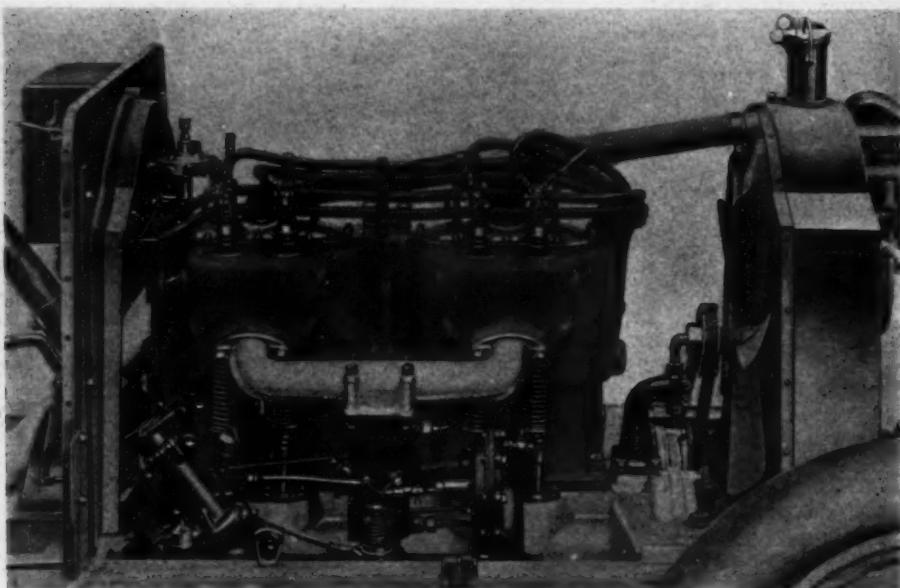
The motor is substantially the same as that of the 1909 car, improvements being confined to the mechanical detail. In order to obtain quiet running and efficiency under heavy duty, the main crankshaft bearings are of large diameter.

Motor Shows No Changes.—The motor of the "Thirty" has four vertical, watercooled cylinders of 5-inch bore by 5 1-2-inch stroke, developing 30 brake horsepower at 650 revolutions. The "Eighteen" motor is of 4 1-16-inch bore by 5 1-8-inch stroke (103 x 130 mm), and develops 18 brake horsepower at 650. The cylinders are cast in pairs with integral water jackets and valve chambers. Cylinders and pistons are ground and interchangeable. The pistons are fitted with four ground rings. The three crankshaft main bearings are bushed with parsons white brass and are supported by massive webs. All bearing surfaces are ground. The connecting rods are drop forged. The crankpin bearings are bushed with parsons white brass and the piston pins with a special bronze. The valves are mechanically operated and interchangeable, the inlet and exhaust valves, on opposite sides of the cylinders. The camshafts are positively lubricated and protected, being encased within the crankcase. The camshaft, magneto, and water-pump gears are equally certain of lubrication and protection from dirt, being contained in a separate, but integrally-cast, oil-tight extension of the crankcase.

The crankcase is cast of a special aluminum alloy in three horizontal sections. The upper section, which forms the engine base, is supported directly on the side members of the main frame. All motor parts are completely protected by



"Thirty" from Above Shows Simplicity.



Right Hand Side of Motor of Packard "Thirty," Showing Carburetor and Governor.

an integral web between the transverse supporting arms on each side, entirely enclosing the space between the motor and frame. The crankshaft bearings are held between the uppermost and middle sections of the crankcase. The bottom section is an easily removable oil well. The crankcase is divided into front and rear compartments by a central partition, which supports the middle crankshaft bearing.

No change has been made in the carburation system. The carburetor, which is of Packard design and manufacture, is of the float-feed, aspirating nozzle type with an automatic auxiliary air-inlet. The nozzle is in the lower portion of the cylindrical and vertical mixing chamber and above it is a butterfly throttle controlling the quantity but not the quality of the fuel mixture. The auxiliary air-inlet, which automatically governs the intake of air to keep mixture at correct proportion for all engine speeds, is a poppet valve under control of an adjustable coil spring. Spring tension to suit different atmospheric conditions is regulated by a small lever on the dashboard. Uniform temperature of the carburetor is maintained by the circulation of warm water through a jacket around the mixing chamber. A primary air-intake shut-off assists starting in cold weather.

Fuel Feed Is by Gravity.—The gasoline feed is by gravity, from a copper tank under the front seat. The total capacity, including reserve supply contained within the main tank, of the "Thirty" standard chassis, is 21 gallons. In the case of runabouts, the gasoline tank is on the rear of the frame and the feed is by a simple automatic pressure system. A convenient gasoline valve controls the main supply, reserve and shut-off.

The water-cooling system is practically the same, with two small but valuable improvements. The suction strainer in the pump is quickly removable for cleaning, without the necessity of breaking any water connections. The filler cap has a new type of fastening which allows it to be quickly opened and closed and yet positively tightens it against leaking.

The water circulation is positive, by a gear-driven centrifugal pump. The radiator is of the cellular type. The capacity of the water-circulating system is five gallons. Forced draft, to increase cooling efficiency, is obtained by a belt-driven, ball-bearing fan, so mounted as to pro-

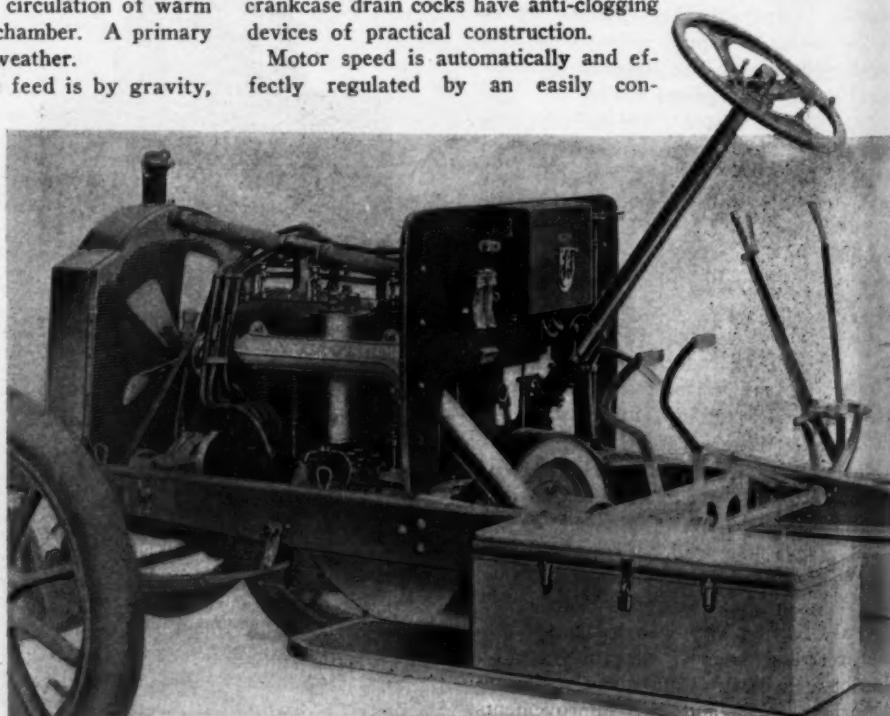
vide easy adjustment of belt tension. In the ignition system there are two detail improvements. The primary wiring, from the battery to the coil box, is carried within a neat protecting tube. The switch handle on the coil box is made in the form of a small lever, which is easily reached and turned by the driver, either with his hand or foot.

Features of the Ignition System.—The jump spark ignition is by the special Packard system. The current is supplied by an Eisemann low-tension magneto, mounted on the left side of the motor bed between the first and second cylinder pairs, and driven directly by enclosed gears. A storage battery, for starting the motor from the seat, is always in reserve, and is carried in an enclosed box on the right running board. The transformer coil for the magneto current and the vibrator coil for the battery current are arranged as a unit in a box on the dashboard. Between them is the combination hand and lock switch above mentioned.

The commutator, to make and break the battery primary current, is on a vertical shaft at the rear of the motor, being driven from the exhaust valve camshaft by enclosed bevel gears. Combined with the magneto is a distributor which, like the high-tension wires and the spark plugs, is common to both magneto and battery systems. There are universally jointed knife switches at the spark plugs.

The splash lubrication system is the same simple, positive system formerly used. A double plunger oil pump feeds the front and rear compartments of the crank case, in which are independent oil levels. The oil pump strokes being adjustable, the oil feed is easily regulated. The pump is accessibly located at the left of the motor and is driven by a worm on the exhaust valve camshaft. Oil is taken from a vertical copper reservoir close to and between the pairs of cylinders, this location insuring uniform temperature and fluid, easily-flowing oil, even in the coldest weather. The capacity of the oil tank of the "Thirty" is one gallon. There are two drip sight feeds on the dashboard and the crankcase drain cocks have anti-clogging devices of practical construction.

Motor speed is automatically and effectively regulated by an easily con-



Dashboard and Left Side of Regular "Thirty" Chassis, Showing Control Levers.

trolled hydraulic governor, incorporated in the water-circulating system and acting directly on the throttle. A pedal, cutting the governor out of action, provides for instantaneous acceleration and high-speed running. The throttle also is under control of a hand lever on the steering wheel. Another hand lever on the steering wheel advances and retards the spark.

The starting crank, which previously had been held by a leather strap, when not in use, is now held in an upright position by an automatic latch.

Clutch Shows the First Big Change.—One of the most noticeable mechanical improvements in the

1910 Packard is the new dry plate clutch. This clutch affords the desirable feature of gradual engagement, and, as it operates without lubrication of any kind, provides the same action in cold as in warm weather. By the use of a special lining material between the plates, the clutch will not burn, even under the severest usage.

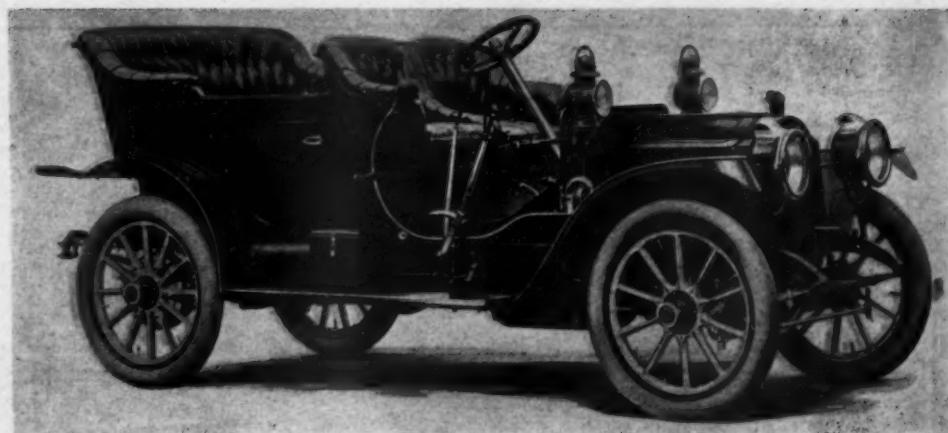
An addition has been made to the gear-shifting hand-lever quadrant, which gives the lever a selective action in the same quadrant slot. This lever is at the rear of the single slot in the quadrant for first speed and at the forward end of the slot for third speed. The introduction of small shoulders on opposite sides of the slot allow the lever to be hurriedly and positively shifted in either direction into second-speed position. Reverse is obtained by the lateral movement of the same lever into a cross slot on the inner side of the quadrant and opposite the neutral position of the lever.

The toggle operating the reverse gear, which has been an exterior feature, is now protected against dirt and used by being enclosed within the transmission gear housing. The other general features of the transmission are the same as have previously been identified with the Packard.

Three forward speeds, providing the most efficient gear ratios for all kinds of driving, and the reverse are obtained by sliding gears, the third speed forward being direct drive. This gear set, as formerly, is combined with the bevel-gear final drive and the differential, to form a rigid rear axle unit, which is contained in an aluminum housing. The latter is internally ribbed to obtain maximum strength and rigidity. The differential gear unit is supported by its own bearings so that the live rear axle may be withdrawn without disturbing the gears. All gears in the transmission, final drive and differential, as well as the rear axle, run on imported annular ball bearings. The extremely long propeller shaft has effectively encased universal joints at each end.

All Brakes Located in the Rear Hubs.—There are four brakes, all acting on the rear wheel brake drums, thus obviating the application of braking power on the transmission. The external contracting brakes are operated by a pedal for regular use. The internal expanding brakes are operated by an emergency hand lever. A drum disc entirely encloses and protects each internal brake. The expanding brake segments are now secured by bayonet locks, preventing rattle.

The improved steering wheel provides greater comfort for the hands, because the wood covering entirely encloses the metal rim and also extends onto the spokes. Another slight change in the steering gear is



Packard "Eighteen" with Touring Body—Is Also Made with Runabout Body.

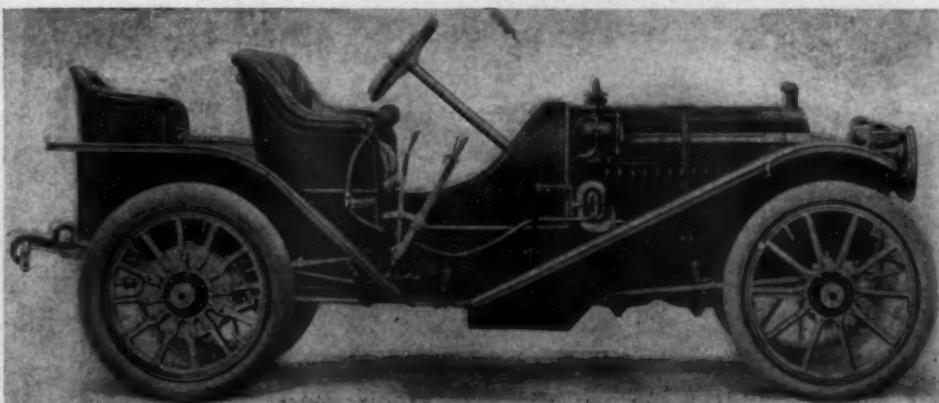
the addition of grease cups supplying lubrication directly to the steering sector shaft bearings.

The worm and sector are forged integrally with their respective shafts. The spindles and jawtype yokes are drop forged. The connecting rod, between the knuckles and the steering column, is placed above the front axle in a manner which minimizes stresses, vibrations, and consequent jar on the driver's hands. There are ball thrust bearings in the steering knuckles. The steering rod joints are encased and all connections have grease cups.

There are four wide semi-elliptical springs. In the "Thirty" the front springs are 40 inches long and the rears 56 inches long. In the "Eighteen," the front springs are 40 inches long and the rears 50 inches long. All spring shackle bearings are now lubricated by compression grease cups. The front axle is of steel tubing, of large diameter and heavy gage. The stationary sleeves of the rear axle are steel tubes, pressed into, and riveted within, the flanged collar of the differential housing.

Some of the Figures Are Interesting.—The wheelbase of the "Thirty" touring car is 123 1-2 inches and the tread standard, or 56 1-2 inches. The wheelbase of the "Thirty" runabout is 108 inches. The wheelbase of the "Eighteen" standard chassis is 112 inches, while that of the "Eighteen" runabout is 102 inches. The tires on the "Thirty" are 36 by 4 inches in front and 4 1-2 inches in the rear, except in the case of the runabout, on which they are 36 by 3 1-2 inches in front. On the "Eighteen," the tires are 34 by 4 inches, front and rear, except on the runabout, where they are 34 by 3 1-2 inches in front.

In all the standard bodies, the chief exterior differences are in the front mud guards and aprons, which have been carried farther forward to increase the protection against mud thrown backward alongside the bonnet. The price of the Packard "Thirty" touring car, runabout, phaeton or with close-coupled body, in standard finish and equipment, is \$4,200. The price of the Packard "Eighteen" open car or runabout, in standard finish and equipment, is \$3,200.



An Attractive "Looker" Is the Runabout Body on the "Thirty" Chassis.



Henry Farman's Own Aeroplane in Readiness to Make Its First Flight.

PARIS, May 14.—A sum of \$20,000 voted by the French government for the encouragement of aeronautics is now being distributed to various promoting bodies. The manner of disposing of the entire sum has not been decided upon, but it has already been announced that the Aero Club of France shall have \$8,600, the National Aerial League \$7,000 for the formation of aerial pilots, and \$1,000 to the Society of Aerial Navigation. Others that will receive grants are the towns of Pau and Douai, and the Aeronautique Club of France.

The Aero Club of France has decided that \$2,800 of its government subvention shall be awarded as a cash prize for the longest aeroplane flight made this year away from a specially prepared aerodrome. One thousand dollars of the prize will go to the pilot of the machine, \$800 to the builder, \$600 to the constructor of the motor, and \$400 to the builder of the propeller. Another prize of \$1,800 will be awarded to the owner of the aeroplane which has remained in the air for the longest period between May 31 and December 31 of the present year. In the dirigible balloon class there is a prize of \$1,600 for the longest round trip, or journey from town to town. Small airships, not exceeding 1,500 meters cubic capacity, will be awarded \$400 for a journey of not less than 31 miles, starting and finishing at the same point.

Clement Working to Win Deutsch de la Merthe Prize.

Adolphe Clement, head of the Bayard-Clement automobile factory, has resolved to win the Deutsch de la Meurthe prize with one of his new airships now under construction at the Astra factory. Engagement has already been made for the prize, to win

which the balloon must fly 125 miles, starting from above the terrace of St. Germain, passing over the towns of Senlis, Meaux and Melun, to return to St. Germain. If successful, the owner of the balloon will be entitled to a gold cup valued at \$2,000 and a cash prize of \$4,000. The prize can be competed for on three successive years, each winner holding the cup for one year and being entitled to the cash prize of \$4,000. The winner on the third year will retain the trophy. On the first occasion no time limit will be fixed during which the trip must be made, the only condition being that a regular speed shall be maintained. For the two following years the trip must be accomplished in a determined time.

Giant Garages for Airships "Liberte" and "Russie."

At Moisson, 30 miles to the northwest of Paris, the largest airship garage ever built is now being erected for the Lebaudy brothers. The huge building, which has a length of 430 feet, a height of 95 feet, and a width of 131 feet, will serve for the simultaneous construction of the two airships *Liberté* and *Russie*, the former for the French and the latter for the Russian government. Both airships are expected to be ready for their trial trips about the month of July. The huge sheds have a framework composed entirely of wood covered with red tiles. The end of the shed forming entrance will be closed by immense canvas screens mounted on rollers.

Germans Plan Airship Line—From Lucerne or Friedrichshafen to North Germany, via Frankfort-on-the-Main, will probably be the route of one of the first regular airship lines.



Baron de Caters Who Has Just Flown on a Volsin Biplane, Equipped with Gobron Eight-Cylinder Motor.

CANADIAN GLIDER BEING CONSTRUCTED.

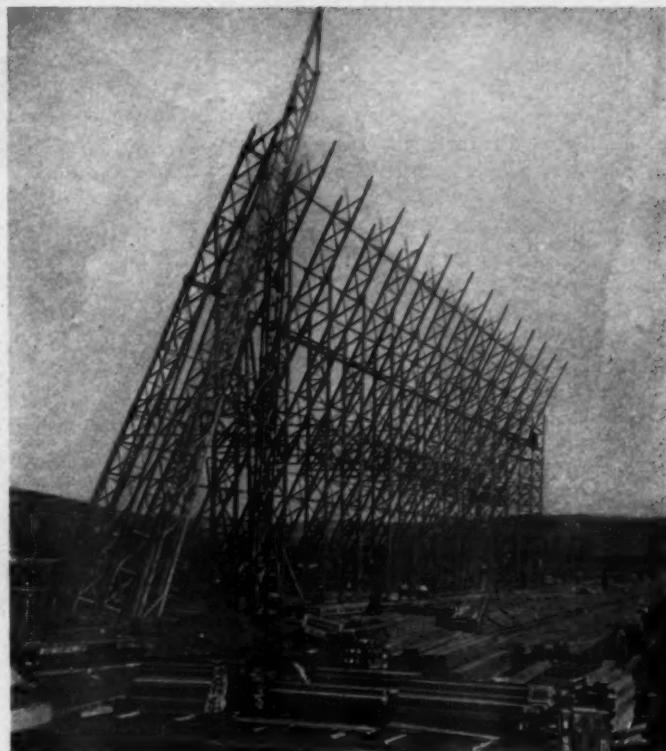
OTTAWA, May 17.—Although this part of the Dominion has been rather backward in aerial experiment, a prominent resident of this city, Dr. Mark G. McElminney, is making great progress with his gliding machine, and hopes soon to be sailing through the air, from hill to hill. The machine, which is nearing completion, measures but 20 feet over all, will have 160 square feet of surface, and weighs but 50 pounds. With it Dr. McElminney expects to learn much about the gentle art of flying, the Gatineau hills being the scene of his experiments. Others are watching his work very closely, and if the machine is a success not only will he build a larger one, but numerous others will also build. It is barely possible, says the doctor, that the present machine may form the framework for an airship, power being added to it later.

KRUPPS FIGURE IN A WRIGHT COMPANY.

BERLIN, May 17.—In the formation of the Wright Flying Machine Company, in this city, it has developed that three of the largest corporations in Germany are interested in the new one. They are the Krupp Works, of Essen, the Allgemeine Electrizitäts Gesellschaft (General Electric Company) and the Ludwig Loewe Company, the last being a leading manufacturer of machinery and machine tools. It is thought that this presages the broadening of the aeroplane branch of aeronautics, and the building of machines upon a large scale. The new concern is called the Flug Maschine Wright Gesellschaft.



Needlewomen Sewing Big Envelope for Airship "Russie."



Putting Up the Framework for the "Russie's" Garage.

FIRST FRENCH WRIGHT MACHINE USED.

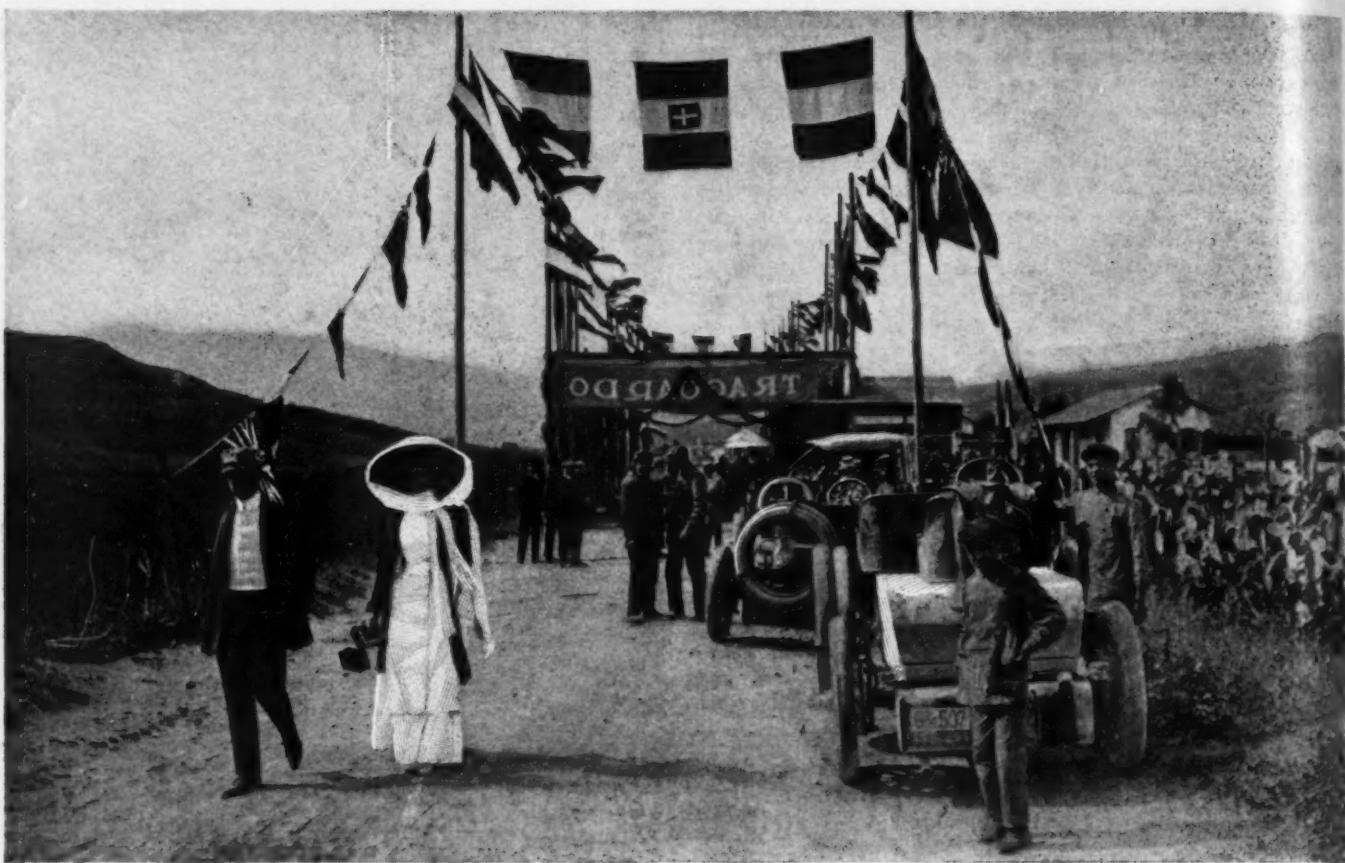
CANNES, FRANCE, May 17.—Comte de Lambert yesterday ascended in the first of the Wright aeroplanes to be built in this country. Four successful flights were accomplished at the Aerial aerodrome, each of a mile and a quarter, in which several difficult turns were taken.

CODY BREAKS ENGLISH RECORD IN FLIGHT.

LONDON, May 17.—S. F. Cody last Thursday broke the English record by flying a mile at a height of 30 feet with an army aeroplane at Aldershot. The Prince and Princess of Wales heard of this and asked Cody to repeat his flight, but in the attempt he smashed into an embankment after going 250 yards. The aviator escaped without personal injury, but his aeroplane was considerably damaged by the collision.



British Tri-plane That Is Being Tested on Lea Marshes, by A. V. Roe—It Is Driven by Six-H.P. Jap Motor.



General View of Starting and Finishing Point—Italian Aristocracy to Be Seen in Foreground.

CIUPPA, AMATEUR, DRIVING SPA, WINS THE FLORIO

PALERMO, SICILY, May 5.—The Targa Florio, the Sicilian mountain race that has seen the exploits of Lancia, Nazzaro and other captains of the steering wheel and which has as its previous winners Cagno, Nazzaro and Trucco, was this year a race of eleven amateurs mounting machines of widely different powers. Ciuppa, a young Italian sportsman, who has not previously been heard of in connection with big races, came home first, having covered the single round of 93 1-5 miles, including the changing of two tires in 2:43:19, which means that his Spa car, one of the most powerful in the group, had maintained an average speed of 34 2-5 miles an hour.

As the drivers were exclusively amateurs, Vincenzo Florio, the millionaire sportsman who is responsible for financing and donating more automobile races than any man living, felt justified in running for the gold cup and \$1,200 in cash. He mounted a Fiat four-cylinder of 4 4-5 bore—the car which had Lancia as its driver in the Targa Florio of 1907—on which he went away first and finished first to the wild enthusiasm of his compatriots. But there was the dashing Ciuppa, started 19 minutes later, who had to be reckoned with, and when he arrived and the time allowance had been made another cheer had to be raised, for the Chevalier had gone down to second position exactly one minute behind the unknown amateur.

Third place went to Airoldi, driving a fine little Lancia four-cylinder car of but 3 1/2 inches bore, which finished twelve minutes behind the winner, beating a Spa with cylinders of the same size, but six in number, by a margin of 25 minutes. Deseta's big Itala, with a four-cylinder engine of exactly the same size as that driven by the winner, could not get better than fifth place, one minute behind the fourth car. A little four-cylinder De Dion, with a piston diameter of slightly less than three inches, came in sixth, but was outshone by its two-cylinder stablemate having a moderate 10-horsepower rating. Berliet had trouble with tires from beginning to end, with the result that he was a

tailender with a small De Dion voiturette entered more with a view to showing reliability than with a hope of capturing the gold cup.

Last year Trucco, on an Isotta-Fraschini, made the record, with an average speed of 35 1/2 miles an hour, the race then being run for 379 miles compared with but 93 miles this year. The tabulated result of the race is as follows:

	Driver.	Time.
1. Spa, 4 cyl., 5.1 inches bore.....	Ciuppa	2.43.19
2. Fiat, 4 cyl., 4 4-5 inches bore.....	Florio	2.44.19
3. Lancia, 4 cyl., 3 1-2 inches bore.....	Airoldi	2.55.25
4. Spa, 6 cyl., 3 1-2 inches bore.....	Cortese	3.20.40
5. Itala, 4 cyl., 5.1 inches bore.....	Deseta	3.21.56
6. De Dion, 4 cyl., 2 9-10 inches bore.....	Stabile	3.21.82
7. De Dion, 2 cyl., 3 1-10 inches bore.....	Olsen	3.34.55
8. Berliet, 4 cyl., 4 7-10 inches bore.....	Rebolla	3.37.57
9. De Dion, 2 cyl., 3 1-10 inches bore.....	Tracona	3.58.46

PEUGEOT WANTED THE CUP.

PALERMO, SICILY, May 5.—Messina in ruins appeared to be a sufficient reason for abandoning the usual Spring automobile races round the mountainous Sicilian course, and instead of an entry blank an invitation was forwarded to the Lion Peugeot firm to return the trophy which they won with one of their single-cylinder cars last year. But the firm preferred to keep the trophy and sent an engagement of three cars, thus forcing the race to be held. De Dion being the only other firm invited to take part in the contest, but six cars started.

When the first of the two rounds was finished Giuppone was leading with his teammates, Goux and Boillot, not far behind. The three De Dion cars were still in the run and going well, but were somewhat lacking in speed. Just when it seemed that Giuppone would bring his Lion Peugeot home first and beat last year's time, he came to a stop with his gasoline tank empty. The finishing post was three and a half miles away, and was the nearest place at which more fuel could be obtained. Jumping

out of his car and seizing the bicycle of a spectator, the Italian driver of the French machine sped down the precipice-bordered road and in a very short time was back again with a gallon can of gasoline on his handlebars.

The mishap cost him first place, for while he was held up his team mate, Goux, went by and definitely captured the trophy for Lion Peugeot, his time for the 186 miles of mountain scaling being 6:48:2. Giuppone got home second, a little less than four minutes behind the leader. The third Lion Peugeot fell a victim to one of the hundreds of bad turns, leaving third place for Olsen on a De Dion Bouton in 7:47:55.

HEAVY TAXES ON BRITISH MOTORISTS.

LONDON, May 6.—While the imposition of fresh taxes on automobiles has for long been regarded as inevitable, few motorists were prepared for the drastic measure introduced by Lloyd George, Chancellor of the Exchequer, in his budget yesterday. At present, apart from the registration fee of £1, an annual tax of £2 2s. is the sole charge on cars, whatever be the power. The new taxes vary according to the horsepower, and for this purpose the R. A. C. rating of DⁿN over 25 will be used—for the present, at any rate. The scale is as follows:

Under 6.5 HP.....	£2 2 0	Under 33 HP.....	£ 8 8 0
" 12 "	£2 3 0	" 40 "	£10 10 0
" 16 "	£2 4 0	" 60 "	£21 0 0
" 26 "	£6 6 0	Over 60 "	£42 0 0

Motorcycles are £1 each, regardless of power.

These taxes come into force at once and are payable annually. A concession is made in the case of doctor's cars, for which only half the above amounts will be charged. Public service vehicles, including motor busses and taxicabs, are exempt from these taxes and will only be rated under the old system.

This is not all, for a tax of 3 pence per gallon has been imposed on petrol, subject to a rebate of 50 per cent. in the case of public service vehicles. These taxes are expected to raise a minimum of £600,000 per annum and the whole of this money is to be expended on the "improvement" (as opposed to "upkeep") of main roads. It is too early yet to record the opinions of the industry's leading men, but the feeling seems to be that the new taxation will mean a general reduction in horsepower for next season's cars, and may lead to extensive development of the long stroke and the two-stroke cycle engine. The tax will also press heavily on the public service companies.

LUMINOUS FRENCH REGISTRATION NUMBERS.

PARIS, May 14.—The decision of French authorities that all cars shall carry their rear registration number in the form of transparent letters and figures lighted by a lamp at the rear, or by an ordinary lantern placed in such a position that the plate can be read as easily by night as by day, has caused considerable disturbance among owners and as much activity among inventors. A box with a luminous front and containing an oil or kerosene lamp is at best such a delicate and dirty contrivance that there is every encouragement to replace it by electricity if this can be done economically.

An interesting device on these lines, consisting of a metal case the necessary length and height to conform with the police regulations, and a plate front with transparent figures, has been produced by Engineer Lacoste. The depth of the box is only 1½ inches, which thus gives a luminous number plate of smaller dimensions than anything else on the market and as easy to fix as the simple plate of regulation size. The plate carrying the figures is secured in position by entering two grooves, and maintained by an end plate fastened by two screws. Within the box is a very small electric lamp, receiving its current from a storage battery carried on any convenient part of the car. The feature of the appliance is a number of mirrors within the box by the use of which the whole of the figures and letters are perfectly illuminated with a minimum consumption of current. Two screws are sufficient to attach the box to the rear of the car, a cable connecting the lamp with the storage battery and a switch are all that are needed to secure a rear number that will never go out, and that will never become smoked so that it cannot be read "as clearly by night as by day," in accordance with the police regulations.

GERMAN COMMERCIAL TESTS IN PROGRESS.

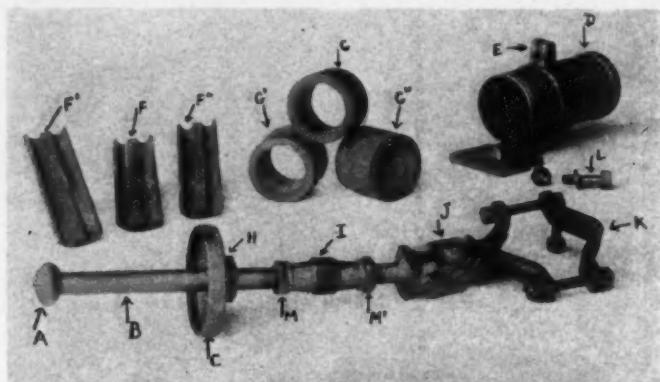
The German military and commercial car tests are now well under way, forty vehicles in all having started from Berlin. Those participating in the latter event wind up their tour in Stuttgart on May 13, while the competitors in the military trial have to get back to the metropolis by May 21. A motor train, fitted up as a workshop, accompanies this section, which, having to be much longer on the road, have shorter daily tasks put them than the industrial section, although the stages are the same.



Arrival of Alroldi and the Little Lancia, Which Finished a Comfortable Third.

LATEST IDEAS IN ABOLISHING VIBRATION

PARIS, May 14.—Shock absorbers are one of the minor improvements that still interest both inventors and automobilists alike, and will doubtless continue to do so until bad roads cease to exist. One of the latest ideas in this direction, produced by Leon & Ballet, two French engineers, consists of a cylindrical metal case attached in a vertical position



Leon & Ballet Shock Absorber Entirely Dismounted.

to the side member of the car, and containing a piston the prolongation of which is secured in a suitable manner to the car axle. Within the cylinder, D in the illustration, are three superimposed rubber rings G G' G'' forming a lining for the hardened steel plates F F' F'', forming three grooves when assembled together. It is within these grooves that the round headed end of the connecting rod A is lodged. When not subject to a shock, the ball head occupies a central position, with a play of about one-eighth of an inch all round.

On the car, springs being depressed, the ball head is, of course, driven upward, and as the grooves become shallower as they near their upper and lower end, the three plates are expanded against the rubber wall, thus progressively braking the movement. After passing the central position on the recoil, the same braking effect takes place in the lower portion of the slides. It will be noticed that there is a universal joint in the connection between the ball head and the axle and that the connecting rod can be regulated in length to suit the requirements of the car or to take up wear.

Another inventor, Georges Levi, would abolish vibration and road shocks by the use of a double set of springs, the second set being carried above the first set and united to them at the extremities by a suitable coil spring connection. The system can be applied to any type of suspension, but where the platform



Showing Same with Piston and Rubber Rings Outside Case.

type is used it would be fitted to the transverse spring. In the case of a three-quarter elliptic it would be the quarter-length that would be supplemented.

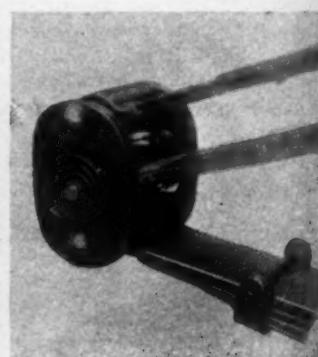
It is claimed for the system that under a light load only the upper set of springs would be called into action, thus removing the disadvantages of hard springs so disagreeable on many cars when running light. Under a heavy load the two springs practically become one and work as one unit. On striking a rut in the road the two springs receive the shock together, but it is the lower one that ceases operation first, the load being left on the upper one alone, which has not sufficient power in itself to oscillate the body. The apparatus has the quality of simplicity and from tests that have been made appears to remove a large amount of vibrating and pounding on rough roads.

NEW AMBULANCES OF THE PARIS MUNICIPALITY.

PARIS, May 14.—The Paris municipality has adopted an improved type of ambulance which, though possessing little that is luxurious, is well equipped with practical appliances for the benefit of its occupants. The chassis has nothing that is distinguishing, being a standard Panhard 16-22, with chain drive. The body, built by Lamplugh, provides a rear entrance to an entirely metal-lined interior. The hospital bed is run onto a cradle down one side of the vehicle, attached by means of coil springs to the walls, and a suitable arm. A plentiful supply of



Levi Compensating Spring.



Same on Platform Type.

both hot and cold water is provided, the tanks being on the outside of the vehicle to the left of the driver. Within the ambulance is a washbasin similar to those used on trains and a single two-way tap providing either hot or cold water at will. Artificial lighting is by means of a special dynamo carried on the footboard and run off the transmission shaft; this supplies current for the head and side lights, as well as for the interior. A series of these ambulances are about to be put into service in Paris, replacing the present horse-drawn vehicles.

NEW AUTO ROAD TO SURMOUNT THE ALPS.

PARIS, May 14.—The Touring Club of France is responsible for a subvention of \$37,600 toward the construction of what will be the highest road in Europe open to automobile traffic. The new Alpine highway in which the club is interested will unite Thonon and Nice, following as closely as possible the Italian frontier, and passing through some of the most picturesque parts of the Alps. The highest elevation is on the Col de l'Iseran, over 8,000 feet above the level of the sea.



After Leaving Sedalia, Colorado, the Approach to the Snow Clad Rugged Rockies Is Imposing in Sublimity.

SURVEY OF GLIDDEN TOUR ROUTE PRACTICALLY COMPLETE

ROUTE-MAPPING for the course of the Glidden Tour is practically completed, for this week has been used by Dai H. Lewis, the official pathfinder in the E-M-F touring car, in covering the roads between Denver and Kansas City. As the run from Omaha to Denver was one long hill climb, the four days to be spent between the western turning point and the finish will be just as long a coast, a feature of the last leg of the contest. The pioneer party reached the "Mile-High City" last week, Wednesday, rested there until Friday, and then began the "trek" across southeastern Colorado and Kansas, expecting to consume a week in the distance to be dealt out to the contestants in four sections. Night stops will be made at Hugo, Colorado, and at Oakley and Salina, Kansas, with Pullman accommodations at these points, as will be the rule through part of Iowa and Nebraska on the westward journey.

The drop in altitude from Denver to Kansas City is 4,489 feet, or about seven-eighths of a mile. The road mileage by the chosen route cannot be stated, of course, until after the pathfinding is completed, but the route follows closely the line of the Union Pacific railroad, and the distance by rail is 640 miles. The second day out from Denver, going from Hugo to Oakley, there is a grand coast of 2,046 feet, or nearly half a mile downward in about 160 miles. This gives an average grade of thirteen per cent. and good braking will be at a premium. The next day, from Oakley to Salina, there is a drop of 1,818 feet, but the distance is nearly 200 miles, so the average of grade is a little less than 10 per cent. Those two are the big coasts, the final day offering only a drop of 482 feet in 190 miles. These will be

royal days, as well for keen competitive sport and for scenery. At night the contestants will camp in sleeping cars standing on lonely sidings near small towns. It is probable that, except for the big fête days at Minneapolis and Denver, these last few stages of the tour will be the most memorable of all.

Thus as mapped out at present the runs of the several days are as follows: First, Detroit to Kalamazoo, 142.2 miles; second, to Chicago, 173.2 miles; third, to Madison, Wis., 175 miles; fourth, to La Crosse, 154.4 miles; fifth, to Minneapolis, 178 miles; sixth and seventh, in Minneapolis; eighth, to Mankato, Minn., 132 miles; ninth, to Fort Dodge, Ia., 143 miles; tenth, to Omaha, Neb., 186 miles; eleventh, to Kearney, Neb., 200 miles; twelfth, to Julesburg, Col., 206 miles; thirteenth, to Denver, 208 miles, and then after a Sunday in that city, the four days across the plains to Kansas City, finishing July 29.

Inasmuch as there were enough evidences of the number of cars to enter by May 15, to insure the Pullman company of sufficient patronage to operate the minimum number of sleeping and dining cars, the entry list at \$200 per auto will be held open until June 15. Thereafter an additional hundred will be added to the entry fee. The Pierce-Arrow Motor Car Company has announced its entry of four six-cylinder cars, two of 48 horsepower each for the Glidden contest proper, for touring cars, and two runabouts of 36 horsepower each for the Hower Trophy.

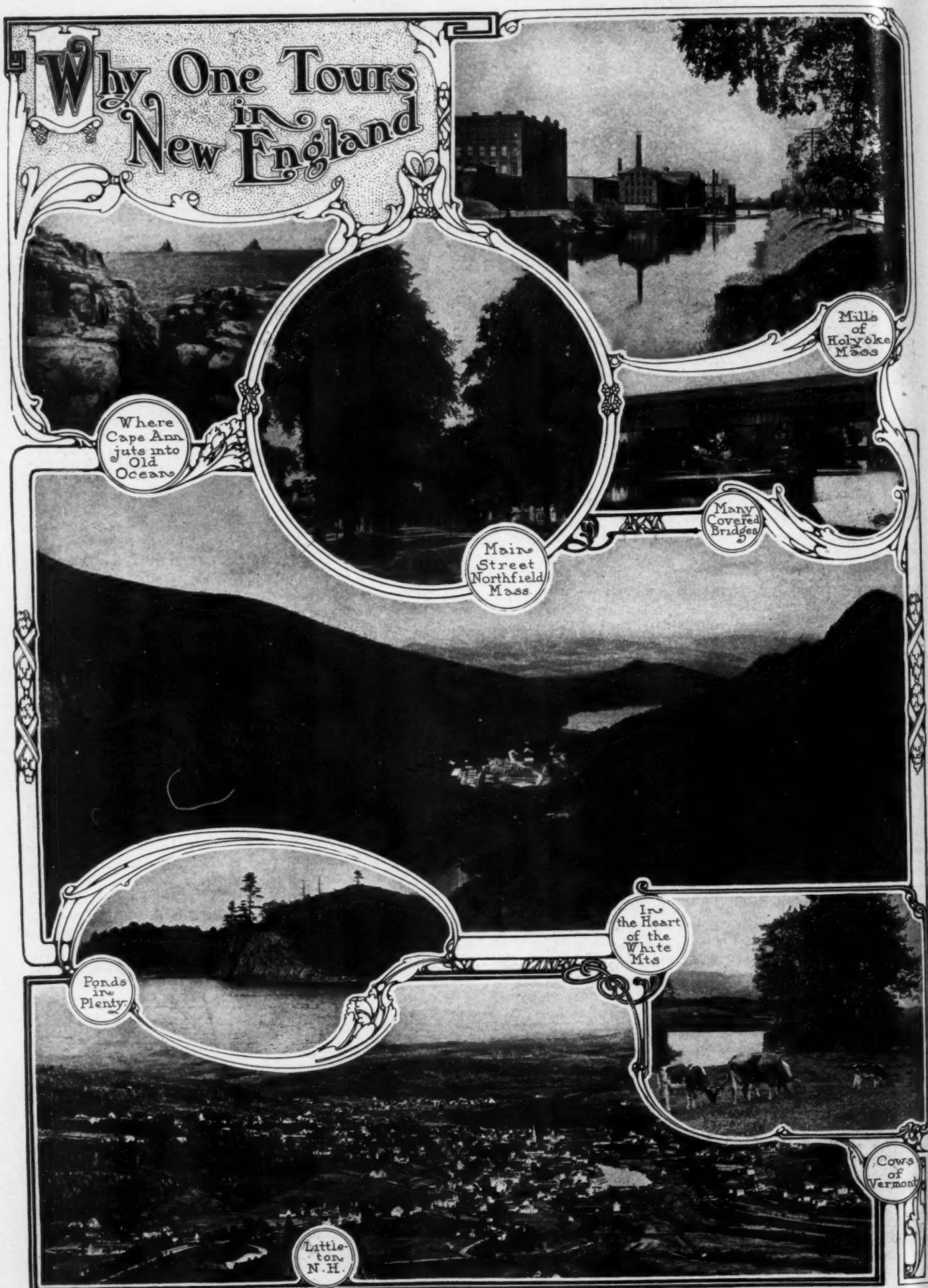
An interesting feature of the pathfinding trip is the rapidity with which the news of the progress of the car has been communicated to the inhabitants of the country through which it has passed. Everybody seems to be waiting for it.



An Old Adobe Home in the Prairie's Midst.



Pathfinder Lewis Is Greeted by a Cowboy.



TOURING 'MID NEW ENGLAND'S VARIED SCENERY

NEW ENGLAND is replete with magnificent scenes and routes for the automobile tourist, and a trip through a valley conceded to be one of the most picturesque of all the beautiful valleys along the Atlantic seaboard, that of the Connecticut River, is the second of a series outlined by the New England Hotel Association. From New York City to the White Mountains and return is a tour of great popularity with automobilists from all over the country, because in these runs of between 700 and 1,000 miles there are views

which are distinctive in their natural beauty, and roads which are the best that can be built. These pertinent features, combined with hotels of marked superiority, give those who tour conditions which equal the far-famed ones of the old world. Compiled in connection with the "Official Automobile Blue Book," the routes suggested by the hotel men are such as to offer either leisurely runs, with stops for luncheon at inns of recognized merit, of fairly quick circuits, or of a hasty trip with long daily mileage when necessary. It is hardly possible to go more than a few miles without passing the headquarters of members of the association.

Three tours have been chosen as those best suited to the owner of an automobile who would tour in the eastern-most tier of the United States, designated as "A," "B" and "C." The first was described in The Automobile of May 6, showing a tour of nearly 1,000 miles through the Berkshire Hills, the Green Mountains, the White Mountains, an extensive run along the sea-coast of Maine, New Hampshire and Massachusetts, and the shores of Long Island Sound. Tour "B" which is presented here is different in its nature, with delightful characteristics of its own, an itinerary that can be used either as a supplement to any of the others or as a route in preference to them. The route out of busy New York is a common one to the series as far as Bridgeport, where "A" goes north, or as an option as far as Springfield, where "A" turns northwestward and "B" continues northward. The shores of Long Island Sound are followed on the famous old Boston Post road to New Haven

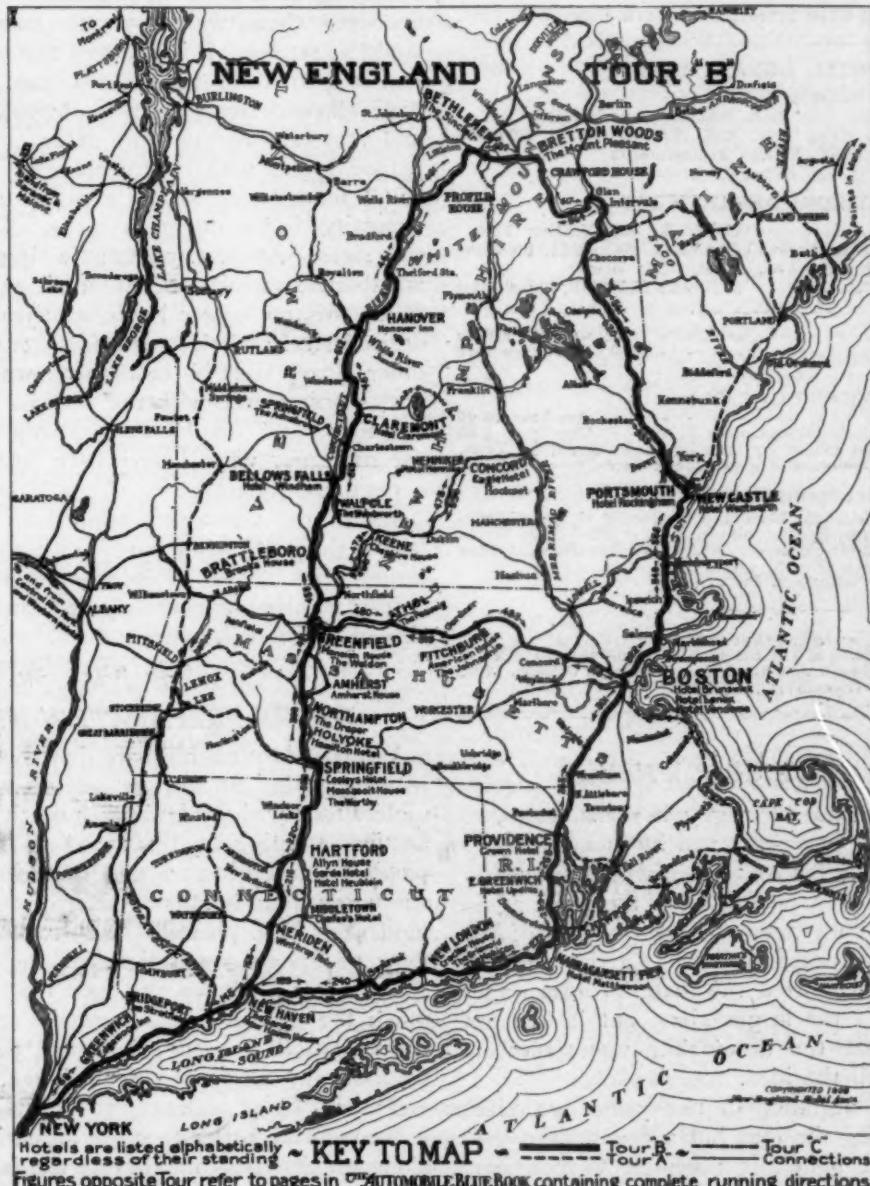
through some of the most beautiful suburbs of the metropolis, between shady lawns surrounding imposing residences, with the views of the water meeting the eye every few hundred yards.

At New Haven a turn is made, the Yale campus passed and a short run taken to the State Capitol, Hartford, first going through Meriden and New Britain, both busy manufacturing places, so that when the Connecticut River is seen at Hartford, and later crossed, its beauty is realized.

For about 225 miles of the total 790 the auto will be driven along the banks of the river, through four of the six States. The roads are generally excellent and at no place less than good, or perhaps fair, while the fertility of the country, the verdure-lined banks of the stream, and the general thriving appearance is sufficient to relieve the most overworked mind, and thus is a source of a real vacation and a thorough pleasure. In addition to the main route, however, there are numberless points from which pleasant detours may be made, all of which are given in detail in the "Blue Book." Massachusetts is entered below Springfield and crossed directly to the north, through Holyoke, Northampton and Greenfield, at the last place meeting the route from Boston through Fitchburg and Athol. From the southern border of Vermont to the White Mountains at Bethlehem or Bretton Woods the tourist is led back and forth

into New Hampshire, through fine pastoral scenery, into mountain passes that compare with anything the world possesses.

A wealth of wild and fascinating country is offered around the mountains, and then one of three routes may be chosen for the trip to the "Hub," the one under consideration being a middle one, direct to the ocean at Portsmouth. From Portsmouth to Boston is over roads that are famous for their hard surface, the delight of the autoist. Providence and Narragansett Pier are prominent points touched in Rhode Island, then New London in Connecticut; at New Haven the outward bound route is met, and the run into New York city a familiar one. Of course, the trip can be made in the opposite direction if desired.





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INFLUENCE OF LARGER WHEELS.

The fact of the influence of large wheel diameters, so thoroughly discussed a few years ago by manufacturers and resulting in the adoption of 36-inch wheels by nearly every maker of large cars, is coming to the front again as the result of recent meritorious performances of the wheels with increased measurements. Carriage manufacturers have long recognized the material advantages accruing to the use of the larger sizes, but it was not until recent years that the automobile manufacturers generally took up with the idea.

Beginning with the agitation of two years ago, sizes were increased all along the line, but a few braver ones did not stop with the generally accepted 36-inch size. Now it appears that the latter were in the right, and sizes again may be subjected to an upward revision which will make a new standard for large cars.

There are now on the American market two cars which may be had with large, or, as they have been called, "carriage-sized" tires. One of these, the one expressing the preference for the larger size of the two, recently came through a very severe endurance contest with a nearly perfect score, while the large tires were the only ones in the whole "bunch" of contestants which went through without any trouble.

In many cases of trouble with deep mud and other severe road conditions, the bigger wheels were always

"on the job," and, as in mud, their very size was an advantage to the car so equipped.

Thus also in the recent one-gallon economy contest in New York City the larger sizes were always to the fore. Of the first four but one was small, and that not very small. The average of these four was 34 inches, which is commonly regarded as a large size. Down at the end of the table are found all of the small sizes and but one of the large ones. This would almost allow of the deduction that large tires, meaning large diameter wheels, are a form of added economy. In this connection it is to be regretted that two exactly similar cars with different sized wheels were not in the contest so that this point could be settled. It is believed that 38- or 40-inch wheels, and a gear ratio which took this into account, would have allowed the winner to improve even the excellent and very noteworthy score made.

One factor which formerly contributed to the use of small diameter wheels, or rather which made them a necessity, is no longer in force. This is the matter of tire sizes. At first, pneumatic tires were made only in small sizes, which meant small wheels or solid tires. Now, this no longer holds, as tires may be had in any desired size, and tire manufacturers would gladly make other larger sizes if the demand warranted. So, one by one, keeping pace with the increase in demands, the obstructions and possible factors which have held back the use of larger wheels have been removed, or reduced to a negligible quantity.

All of the arguments applied to the use of any size larger than 28 inches apply with equal force to the still larger sizes above 36 inches. Summing up all of the points, the time appears ripe for another increase in the size of automobile wheels.



WHERE PREPARATION MEANS MUCH.

While it is probably true that there are a great many people capable of starting out on a long-distance automobile tour without bothering much in the way of preparation, trusting to the mood of the moment for the picking of a night stop and following unexplored roads, the wisest plan in this country of doubtful hotel accommodations is to plan the route carefully and pick a hostelry of known reputation for the sleep which always comes after a day on the open road. Nothing spoils so much the pleasure of automobile traveling as poor accommodations for the night and the invariable accompaniment of mediocre replenishment for the hungry inner man. Don't endeavor to do too much in a day, and it is much the better to make an early start and get well along on the day's run before the laggards of the highway have appeared for their midday siestas or else their eleventh-hour scorching to reach the next big town.

A mingling of town and country in the matter of picking the journey's interruptions adds variety to the trip, which is especially sadly missing when only the crowded city entices the traveler greater than the lure of the green-dressed country with its valleys, and lakes, and rippling streams. Hence, study well before you start out for a long trip, leaving the hit-or-miss episodes for near-home chances, for it is a case of where time spent in preparation will be hours gained on the road, to say nothing of the consequent comfort from utilizing the carefully compiled information of the Blue Book series.

PENNSYLVANIA LAW EFFECTIVE JAN. 1.

HARRISBURG, Pa., May 17.—Automobilists from outside of Pennsylvania should make note of the fact that the new Pennsylvania law does not go into effect until January 1, 1910. The first impression was that the clause in regard to reciprocity to non-residents of those States granting reciprocity to Pennsylvania autoists would become effective at once. According to Joseph W. Hunter, State Highway Commissioner, this clause of the law awaits the application of the entire act, which does not become effective until January 1, 1910. Hence, it is stated regretfully, that Pennsylvania will continue the present year to ask non-residents to obtain licenses as before from the State Highway Commissioner, the fees remaining at \$3 for driver's license, yearly renewal January 1; registration of car unnecessary, but driver's license tags must be carried.

IN ENFORCING NEW JERSEY'S LAW.

TRENTON, N. J., May 17.—In filing complaints and evidences against non-resident automobilists with the State Motor Vehicle department, magistrates must hereafter accompany same with a 30-cent fee and the necessary mileage. This decision was handed down last week by Assistant Attorney-General Gaskill in settling a dispute between Magistrate Noar, of this city, and Motor Vehicle Commissioner Smith. The former contended that the latter was compelled to push all cases sent to him by magistrates; the commissioner said that in many cases the costs of prosecution would be prohibitive. Attorney-General Gaskill's opinion states that the Motor Vehicle Commissioner may issue summonses in cases "which he regards as meritorious." It seems certain that future prosecutions will be confined to those cases where there is a good chance of getting at the culprit.

NEW PHASES OF OHIO AUTO LAW.

COLUMBUS, O., May 17.—Several important rulings relative to the operation of automobiles have been made by the Ohio automobile department and the attorney-general. The department has decided that when a member of the family owning a car drives it is not necessary to take out a chauffeur's license. Identification by the tags is considered easy when the car is driven by the owner or a member of the family. In contrast to this is the statement from the attorney-general that when a car is owned by a corporation and used by many of the officers and stockholders, each one will have to provide himself with a license as chauffeur, because the ownership of the machine by the corporation does not identify officers and stockholders.

WISCONSIN SENATE PASSES AUTO LAW.

MILWAUKEE, Wis., May 17.—Recklessness determined by the occasion may be the speed limit of automobiles in this State, with a nominal limit of 25 miles per hour, if the bill which has passed the Senate goes through the Assembly and is signed by Governor J. O. Davidson. The bill was prepared by Senator E. E. Page of this city and practically wipes out the speed limit, substituting the terms of recklessness, and amendments were made in the upper body requiring operators to slow down at corners and prohibiting persons under 16 years of age from running a car unless accompanied by parent or guardian.

PENNSY'S CROSS-STATE ROAD MUST WAIT.

PHILADELPHIA, May 17.—After long and serious consideration, Governor Stuart, on Friday last, reluctantly and sorrowfully vetoed the cross-State highway bill. This measure, which the Governor bent every effort to put through both houses of the Legislature, called for the expenditure of \$5,000,000 within three years, and with so many demands upon the treasury from schools, hospitals, the indigent insane and the consumptive poor, His Excellency could not find it in his heart to sign the bill.

MRS. LONGWORTH GETS OHIO TAGS.

COLUMBUS, O., May 17.—Fred H. Caley, superintendent of the Ohio State automobile department, has shipped to Mrs. Alice Roosevelt Longworth a set of tags for a gasoline machine with which she expects to do considerable touring in Ohio this Summer. The tags were shipped to Washington, D. C.

FUTURE OF GRAND PRIZE WORRIES SAVANNAH.

SAVANNAH, Ga., May 17.—The Solid South is interested in the action of the Savannah Automobile Club relative to the future of the Grand Prize Race. The club held a meeting recently at which the matter was talked over. In a letter received from the Automobile Club of America there seem to be very little hope of having another international race, as the foreign manufacturers have agreed not to enter future races, but neither the A. C. A. nor the Savannah Automobile Club have given up the idea and everything possible will be done to have one held. Mayor Tiedeman will leave for Philadelphia on Tuesday and will go to New York, where he will talk with officials of the A. C. A.

WESTERN EDITION OF THE BLUE BOOK.

Robert Bruce, editor of The Official A. A. A. Automobile Blue Books, has just returned to Chicago, where he has been located with his staff for some time past editing the Western edition. Mr. Bruce has been preparing a series of trips from Chicago in every direction and has covered up to date over 6,000 miles of territory never before adequately described. In the meantime Blue Book Car No. 1, in charge of E. R. Mixer, is nearing Chicago through Ohio and Indiana, preparing and new revising main routes from the East. The new section of the "Blue Book" will cover Ohio, Indiana, Illinois, Michigan, Wisconsin and Kentucky, and will connect by the best roads the principal cities west of the Mississippi River.

BOSTON DECIDES TO HAVE 1910 SHOW.

BOSTON, May 17.—Success in such a large measure resulted from the 1909 show in Mechanics Building that the Boston Automobile Dealers' Association last week took official action in regard to the 1910 exhibition. The corresponding week of next March will be the date and Chester I. Campbell will again manage the affair. Reports of the last show have indicated that it was the most successful ever held, considered from any angle, the gate receipts were larger than usual, the general interest was greater and the effects are still being felt as a sales stimulus. The dealers have decided to take an active part in the Orphans' Day outing on June 9, and will take the blind children of the Perkins Institute on a trip to Sharon later in the same month.

ORPHANS' DAY IS APPROACHING.

Orphans throughout the country will have their annual automobile outing on June 9. This will be the fifth celebration of the day in some cities, and already preparations have been made for making the 1909 event the most memorable of them all. The automobile trade has always been a supporter of orphans' day, and this Summer a special campaign will be outlined to secure the machines from private owners as well as dealers and manufacturers. W. J. Morgan has the metropolitan outing in charge and it is his idea to present to the orphans' day committee a plan of having each make of car in the run fly a pennant with its name and number. This little feature is partly advertising and partly because nowadays the public is more interested in the make of the cars taking part than any of their entrants or drivers. The Quaker City Motor Club will engineer the celebration in Philadelphia and cars for nearly 1,000 children have already been promised. With plenty of cars at their disposal and plenty of small children ready to fill them, the committee expect to make the event one that will be long remembered.

What the Clubs are Doing These Days

COLUMBUS ASSOCIATION ELECTS OFFICERS.

COLUMBUS, O., May 17.—At the annual meeting of the Columbus Automobile Association, held in its club rooms recently, the following officers were elected: President, Max Morehouse; first vice-president, P. B. Monypeny; second vice-president, Dennis Kelly; secretary, N. O. Aeby, re-elected; treasurer, Herman Hoster. The club has arranged to start a series of short runs on Saturdays and Sundays, and the national orphans' day will be celebrated by taking the little folks to the Country Club. An automobile show will be held in the Fall.

ATLANTA'S CLUB NOW HAS FINE NEW HOME.

ATLANTA, GA., May 17.—The Fulton County Automobile Club is now well settled in its club house and is fortunate in the possession of a fine old country place. This house was built as a residence by one of Atlanta's wealthy citizens and when it was thrown on the market the club gobbled it up. The house is



Fulton County Automobile Club's House Near Atlanta.

located on the Peachtree road, about five miles from the city, and is situated far back from the road in a grove of fine old forest trees. It is fitted up with all the taste of the homes of the wealthy and cultivated and it is doubtful if any automobile club in the country has a more artistically furnished house.

WALLA WALLA AUTOISTS ORGANIZE.

WALLA WALLA, WASH., May 17.—Temporary organization of automobilists of this city was changed into a permanent one at a recent meeting attended by nearly all local autoists. The following officers have been chosen: President, Dr. E. E. Shaw; vice-president, J. W. Lankdon; secretary, Tom Drumbell; treasurer, W. W. Baker; board of directors: T. A. Paul, Dr. E. E. Shaw, W. J. Corkrum, W. W. Baker, Tom Drumheller, J. H. Morrow, John Langdon, C. J. Bowers, Gilbert Hunt, George Kellogg, J. M. Crawford, E. H. Preston.

PROSPECTS FOR NEW CLUBS IN WISCONSIN.

MILWAUKEE, WIS., May 17.—The usual spring activity in club circles is manifesting itself now, and a number of new clubs are being formed. The commercial association of the Eau Claire is taking steps to form a club, which will affiliate with the State and national bodies. A number of owners at Lancaster are considering the proposition to form a local club.

CLEVELAND CLUB ACTIVITY—GOOD RESULTS.

CLEVELAND, May 17.—The Cleveland Automobile Club is at the present time taking a most active interest in autoing conditions in Cleveland and northern Ohio, and as a result is receiving the co-operation not only of motorists but of the police force, in addition to the state board of registration.

For some time there has been an epidemic of stealing in this city which the police have been powerless to prevent. After waiting some time for the police force to make a definite move, the Automobile Club stepped into the breach with an offer of a reward of \$100 for the arrest and conviction of any one caught stealing an automobile *or any part thereof*, with the result that the thieves have grown wary and cars standing on the streets at night are now practically safe. "Joy riding" has been practically stopped by revoking licenses.

Perhaps the most important action of all those taken by the club relates to reckless driving and speeding. Threatened with the passage of an eight-mile-an-hour ordinance in all parts of the city, the club proceeded to join hands with the police and an effective campaign against law-breaking drivers is now on in full force. A bureau has been established at the club to assist in this work, and the club members are requested to send in the numbers of speeding cars. The owners of these cars then receive warning notices from the secretary's office, and after repeated offenses the numbers are voluntarily turned over to the police with a request that drastic action be taken. As a result of these crusades the club is coming into the limelight in northern Ohio, and the membership is increasing by leaps and bounds toward the 1,000 mark.

PITTSBURGH ACTIVE IN GOOD-ROADS WORK.

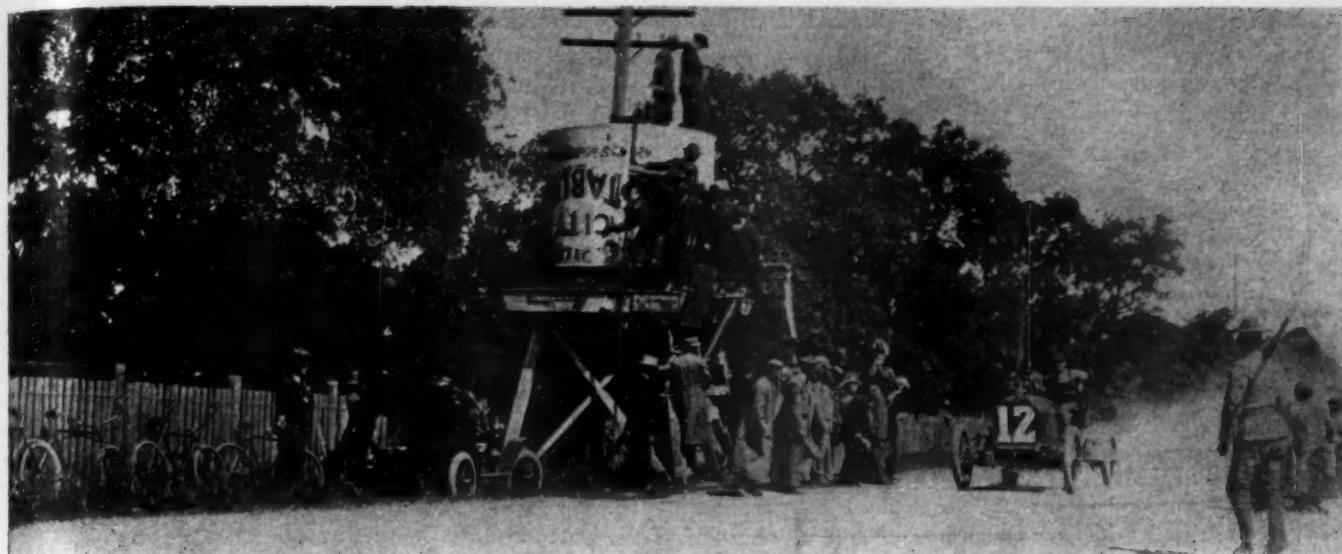
PITTSBURGH, PA., May 10.—Allegheny County roads are being constantly improved through the activity of the Automobile Club of Pittsburgh, in co-operation with the road supervisors and engineers. The influence of the club has been directed by George T. Barnsley, good roads engineer and chairman of the road improvement committee. The county is now spending about \$1,000,000 per year for the purpose of bettering its highways, and 60 miles of macadam will be constructed this year. As a result of its interest in the supervisors there are now 15 road drags in use and reports show that the cost of keeping the roads has been reduced from \$35 to \$8.50 per mile, the drag needing only three men instead of six.

Secretary Wolff and other officials recently met with the supervisors of Mercer County, aiming to get the road from Mercer to Zelienople and Meadville macadamized. Mercer, 50 miles north of this city, is on the main route to Buffalo. The club will issue its road book on June 1, containing 110 routes in detail.

SAVANNAH ENDURANCE RUN TO BE MAY 31.

SAVANNAH, GA., May 17.—The next event of interest to the automobilists of this vicinity will be the endurance run to Augusta and return, a distance of 132 miles each way. The Automobile Club at a recent meeting decided to hold this on the last day of the month, starting at seven o'clock in the morning.

It is not to be in any manner a speed test, but endurance will be the standard by which merit will be measured. It is likely that twenty cars or more will make the trip and the car with the least stops will be rewarded the trophy. Secretary Arthur Solomon was given the duty of preparing a list of penalties which will govern the run. Another point of interest brought up was that ladies would be allowed to make the trip.



Ben Noonan, Winner of the Santa Rosa Road Race, Crossing Finish Line in His Stoddard-Dayton.

CALIFORNIAN RACE HAS A STODDARD-DAYTON WINNER

SAN FRANCISCO, May 10.—Under the joint auspices of the Sonoma County Automobile Association and the San Francisco Motor Club, the first road race in the northern part of California, held yesterday near Santa Rosa, had a Stoddard-Dayton as a winner. The course was 40 miles long, and a particularly hard one because of the many turns and the condition of the road surface. The first 15 miles constituted a very badly twisted "straightaway," with a number of turns at an angle of nearly 45 degrees. The road surface was rough for fast work, and that an accident did not occur is little short of a miracle. After this came the greatest test, in what was known as the "Loop." The road winds from Geyserville through the Dry Creek country, and back to the so-called "straightaway." It is full of sharp turns, many of them at the apex of steep grades.

Twelve cars started, eleven of which practically came to grief, although six reached the finishing line. The honors of the day went to the Stoddard-Dayton, entered by A. D. Plugoff, and driven by Noonan. The elapsed time of the winner was 1:05:18, which won for it the \$500 trophy. The Moore Motor Supply Company's trophy, which was second prize, went to the Stevens-Duryea, entered by the Pacific Motor Car Company, and driven by C. Ontank. He covered the course in 1:07:30, despite trouble encountered. In the loop the car crashed into a fence and cracked the frame, which broke when driven over the rough ground on the homestretch. Ontank finished, however, and crossed the line

in second place. The Stoddard-Dayton, which came in third, was driven by Fred Wiseman, who lost time in recovering a battery which dropped off. Fay Sheets, at the wheel of the Acme, drove the last 17 miles on the rim of the left front wheel from which the tire had been thrown. He swayed and careened over the finishing line, having covered the course in 1:11:37 1-2. The Buick, which arrived fifth, came to grief through a broken gasoline feed pipe, caused by hammering over the rough roads. Several minutes were spent in repairing the pipe, and the car's elapsed time was 1:15:12 1-2. The Tourist, a California-built car, entered by H. W. Bogen, came sixth.

It was a fine day for the spectators, but a most expensive contest for the owners of most of the cars that participated. The course was patrolled by a squad of the State militia, assisted in handling the immense crowd by the supervisors of Sonoma county, the police of Santa Rosa, and the officers of the two automobile associations.

Those who had charge of the event were: Starter, William R. Johnston; assistant starters, Captain Fred A. Marriott, Jr., W. B. Morrell; clerk of the course, A. D. Plugoff; chief timer, P. F. Gillette; timers, W. B. Lloyd, W. W. Peterson, William Pedlar, William Hinklebein; judges, Fernando Nelson, William M. Klinger, J. H. Gray, J. W. Griffith, R. R. l'Hommedieu; referee, C. C. Donovan; contest committee, Don C. Prestiss, chairman, and J. R. Leppo.

CHICAGO'S ROAD RACES ARE RAPIDLY FILLING

CHICAGO, May 17.—Entries to the Chicago Automobile Club's races, set for June 18 and 19 over the Crown Point-Lowell course, will close officially June 5 with Frank H. Trego, although provision is made for possible stragglers by giving them five days of grace in which they can enter upon payment of \$250 extra per car.

At the present time there are sixteen actually in hand—eight in each race—while the outlook is that there will be twenty at least in each contest, General Executive Trego having a long list of prospectives. The last name to be added to the entry list was that of Knox, which has named two cars for the Cobe cup, the blanks for which came to hand Saturday. This was preceded earlier in the week by the nomination of a Fiat by E. A. Hearne, of Chicago, the owner of the car, and who already has had racing

experience through having been a competitor in the light-car race at Savannah. The Isotta, Benz and Renault also are on the likely list, while it is reported that Apperson and the Locomobile will be in inside of a week. The Pennsylvania is counted on for two, while the Thomas people are now tuning up a 1910 little six. As the list now stands there already are in the Cobe race two Knoxes, two Stoddards, three Buicks and a Fiat.

In the light-car event there are the Moon, three Buicks, two Stoddards and two Marions, the last named having been nominated earlier in the week. Two Chalmers-Detroits are expected.

As a result of a careful odometering of the course by General Executive Trego, it is announced by him to-day that the circuit is exactly 23.6 miles in length. In the Cobe cup race the cars will make seventeen laps and in the Indiana trophy ten laps.

CHANGES IN YORK COMPANY PERSONNEL.

YORK, PA., May 17.—President S. E. Baily and General Manager and Designer James A. Kline have severed their connections with the York Motor Car Company, manufacturers of Pullman automobiles. For some time this move has been rumored in automobile circles, but has just been announced officially and a number of changes have thereby been made. Mr. Baily withdrew recently and Mr. Kline on Saturday, selling part of their stock to New York parties and retaining some, it is understood. The report that the General Motors Company was interested is said to be unfounded, and the local concern will hereafter be directed by Oscar Stevenson and Thomas C. O'Connor, formerly secretary and treasurer and vice-president, respectively. The former will act as business manager.

Mr. Baily, who has an extensive business in carriage building, has started the erection of a new concrete automobile factory in which commercial cars will be built at first, and then the lines of pleasure cars added.

As general manager and designer Mr. Kline has contributed largely to the success of the York company, bringing it to a point where the supply of Pullman automobiles is less than the demand. He has propositions from a number of automobile concerns which he is considering. At present he is attending to private interests in this city and Harrisburg. As the entrant of Pullman automobiles in all of the important track and endurance contests of the east, aside from his business relationships, he has gained a wide acquaintanceship among the trade.

TRACY TESTS NEW DIAMOND RIM AND TIRES.

As a preparation for the Cobe trophy race, and to give a critical test to the new demountable rims developed by the Diamond Rubber Company, Joseph Tracy recently made eight laps of the 1908 Vanderbilt race circuit, maintaining an average speed of 60 miles an hour, and reaching a maximum of 92 on the motor parkway. According to his report, as issued by the Diamond company, the new rim and the Diamond grip tire for racing and anti-skidding work, after going through the mill of every kind of a test Tracy's experience could suggest, were not affected. The tire casings were not materially injured and the rim in the same condition as at the start. No change of tires was necessary in the entire eight laps, and on the full set not more than a score of steel studs were loosened. The car used was a 90-horsepower Simplex, and to demonstrate the time necessary to change tires, the car was brought to a quick halt from full speed at the end of the eighth circuit, and Tracy states that it took just 30 seconds to take off the tire and rim and place fresh ones on the wheel. This test has assured the Diamond company to its own satisfaction of the ability of the rims and tires, and an active participation in current races is planned.

MORE ADDITIONS TO RAMBLER FACTORY.

KENOSHA, Wis., May 17.—Enlargements now being made to the factory of Thomas B. Jeffery & Company in this city, when combined with those buildings to be erected within the next few months will give the plant an additional space of 186,256 square feet. Added to the present space, the total will be approximately 800,000. Rambler factory construction will be followed, that of one story, solid concrete structures, with steel frames, and saw-tooth roofs. One building now under way, with an area of 98,688 square feet, will be devoted to inspection and exterior finishing departments; 41,120 will be the area of the addition to building number 7, used by the final inspection department, and number 5, the assembly and stock rooms, will secure 16,488 additional. The original Rambler factory, building 1, will be enlarged by the addition of 30,000 square feet, all of these together greatly increases the capacity of the plant. A new laboratory for testing materials will be installed, and within a year a new office building will be started.

THE DEATH OF DANIEL W. MARMON.

INDIANAPOLIS, IND., May 17.—Daniel W. Marmon, president and one of the founders of the Nordyke & Marmon Company, died at his home in this city last Monday, after an illness of seven months. Death was not unexpected as he had been in a serious condition for some time.

Mr. Marmon was born in Ohio, moving to Richmond, Ind., with his parents when two years old. After completing his education in the schools and Earlham college in that city, he purchased an interest in the firm of A. and H. Nordyke, manufacturers of flour milling machinery. This company was then reorganized as the Nordyke & Marmon Company and in 1876 moved to this city. When automobiles became used so generally a few years ago, the company was one of the first in the city to engage in their manufacture. Associated with Mr. Marmon in the business were his sons, Walter and Howard C., who with the widow and a daughter survive. The funeral services were held last Thursday afternoon.

The factory and down-town salesrooms were closed on Tuesday, Wednesday and Thursday. Mr. Marmon was also president of the Indianapolis Light and Heat Company.

PACKARD TRIES OUT THE ZEGLEN.

DETROIT, May 17.—That tire troubles are due to be reduced to a minimum if not entirely eliminated as the result of his invention is the confident prediction of a Chicagoan named Zeglen. Nor are his claims impaired any as a result of tests he has been conducting here, with the cooperation of the Packard Motor Car Company. Taking two heavy planks, Zeglen filled them with sharp pointed nails of varying lengths. On the back of each of these another plank was securely fastened so that the nails could not be pushed back. Then a Packard car equipped with Zeglen tires was run over these nail-studded planks, slowly and at a speed of twenty to thirty miles an hour. Singularly enough, the tires, which are made of bullet proof cloth treated with rubber and vulcanized, did not show the slightest effects of the hard usage to which they were subjected. More exhaustive tests are being arranged for the Packard people, while Zeglen is planning to erect a factory here for the manufacture of non-puncturable tires.

THIRTEEN ENTRIES FOR RUN TO SEATTLE.

NEW YORK, May 17.—Announcement has been made of thirteen entrants for the transcontinental endurance contest, which will start June 1 for Seattle. They are as follows:

FORD	Ford Motor Company.
FORD	Ford Motor Company.
ACME	Acme Motor Car Company.
STEARNS	Oscar Stolp.
SIMPLEX	Simplex Automobile Company.
SHAWMUT	Shawmut Motor Company.
THOMAS	Gus Buse.
RENAULT	W. G. Houck.
THOMAS	E. R. Schmidt.
FRANKLIN	S. S. Mapes.
WELCH	L. H. Perlman.
STEARNS	Chas. Watson.
GARFORD	Wally Owen.

Mills & Moore, the Eastern managers, have given out this list with the statement that several others may enter before the start. In the meantime the Thomas pathfinder has finished its survey of the roads around Boise, Idaho, and is now within striking distance of the finish. The Seattle authorities have about completed the building set aside for the cars which finish the contest.

NEW COMPANY FORMED IN CLEVELAND.

CLEVELAND, May 17.—Within a few weeks, the Cleveland Electric Vehicle Company, formerly the Cuyahoga Motor Car Company, will begin the manufacture of electric taxicabs. The reorganized concern is capitalized at \$300,000, and Francis J. Wallace, formerly of New York, who floated the Citizens' Taxicab Company in this city, will handle the sales.

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Told in the Progress of the Industry

Pierce-Arrow Factory Additions.—When the new factory of the Pierce-Arrow Motor Car Company, at Buffalo, was completed about a year and a half ago, it was thought that it would be sufficiently large for a long period. The first addition has become necessary, however, and it will be to machinery hall, one story in height, 201 feet long and 50 feet wide, giving 10,500 square feet additional floor space. This will be utilized for the installation of new machinery and will give machinery hall a complete floor space of 92,705 square feet. The new section will be built of reinforced concrete. A second addition will be built to enlarge the body-building department. It will be 60 by 75 feet in size and three stories high, giving an additional floor space of 24,000 square feet and making that of the department 161,040.

Winton Self-Starter Holds Its Pressure.—The Winton Company is frequently asked whether the pressure on its self-starting system holds during long periods of inaction, and the following letter received from B. A. Armstrong, of New London, Conn., is cited as the experience of one owner. Mr. Armstrong says: "Referring to my new 1909 Winton, it is a fact that this car was jacked up in my garage late in December or early in January. My chauffeur says the pressure was 110 lbs. when we left it. I spent the Winter in Florida, returning on the 10th of April. A few days later we put the car in commission and we found the self-starter pressure was 90 lbs., and the car was started without cranking; in other words, the self-starter was in full operation after the car had stood nearly four months."

Palmer-Singer Makes Hard Run Across Desert.—Clarence E. Conent, of El Centro, Cal., has recently made a trip in his P. & S. Six-Sixty car, which is notable among the hard trips possible on the Pacific Coast. He drove from El Centro to San Diego, 260 miles, over trackless deserts, and then crossing the mountains. After a day in the latter city he returned to his home in a day, both going and returning without a mishap, part of the distance running where there was no road, and for the greater part where there was a mere outline of wheel tracks. The route is considered one of the worst in California, and generally impassable for automobiles. Mr. Conent's car is over a year old, and the two hard runs seemed to have no deleterious effects upon it.

Mrs. Ramsay Plans Transcontinental Tour.—Final preparations for a tour in her Maxwell car from the Atlantic to the Pacific are being made by Mrs. Alice R. Ramsay, of Hackensack, N. J. She expects to leave New York City on June 9 in her new 30-horsepower car, and hopes to reach San Francisco by July 15 over a route through Albany, Rochester, Buffalo, Toledo, Chicago, Cedar Rapids, Omaha, Julesburg, Cheyenne, Granger, Ogden and Reno. Accompanying her will be Mrs. N. R. Powell, Mrs. W. Atwood and Miss H. Jahns, all of Hackensack. Mrs. Ramsay is an experienced

tourist, the president of the Women's Motoring Club of New York, and of the women's section of the Maxwell-Briscoe Motor Club.

Where the Old Cars Go.—"There has always been considerable mystery in the mind of the public where all the old cars go," says "Tommy" Forbes, sales manager for the Overland and Marion cars, "but for me this mystery was dispelled during a recent trip to the West. Hundreds of old-timers made back in 1901, 1902 and 1903 are being used there and are giving perfect satisfaction. I saw many rear-entrance cars, and it is no uncommon matter to hear the chug-chug of 'one-lungers.' Many beginners in the West are using these old machines and I find that many are finding a lodging place in the Y. M. C. A. and other automobile schools."

Credit Where Credit Belongs.—By a regrettable oversight in connection with the photographs taken by night, which were published in THE AUTOMOBILE May 13, the omission of the word "Bureau" from the copyright credit, attributed the ownership to the Technical Press, a printing concern in New York, instead of to the Technical Press Bureau, which makes a business of supplying articles on automobile and motor boat subjects. The three night photographs were taken by Harry W. Perry, and are copyrighted, but the daylight photos are not copyrighted, and the notice should not have appeared upon them.

Kokomo Concern to Make Carburetors.—The Planhard Manufacturing Company, of Kokomo, Ind., has been formed to manufacture carburetors and other automobile accessories. The officers are: President, W. D. Parr; secretary, W. B. Voorhis; general manager, F. L. Kingston; factory superintendent, C. H. Felske. Mr. Kingston has been connected for a number of years with Byrnes. Mr. Felske has been with the Apperson Kingston & Company, of Kokomo, and

Brothers Automobile Company. It is expected that the new plant will be open about June 1 and will employ a force of 25 men.

Locomobile Company Will Increase Factory.—Plans have been made by the Locomobile Company of America for a large addition to its factory at Bridgeport, Conn. The new part will cover an area of 40,000 square feet and enable the factory production to be made 1,200 automobiles a year. It will be possible to add from 300 to 600 mechanics to the present force, and under the present plans the cost will be about \$60,000. The wing on the north side will be continued three stories in height, of brick and steel construction, and ready for occupancy early in the Fall.

"Tailor-Made" Wind Shields.—From the fact that no two automobile makers use the same kind and size of dash, requiring the manufacturer of glass fronts or wind shields to keep on hand samples of all makes, the Bunker Wind Shield Company, of Pittsburgh, Pa., has adopted the expression "tailor-made" as applicable to its products. These shields have to be made to fit each dash to a nicety, and to do this templates of all various sizes and widths have to be kept on hand, and necessitates fine machinery and manufacturing facilities.

Electric Vehicle Receivers' April Report.—The April report of the receivers of the Electric Vehicle Company covering business done shows sales of \$87,819.35, with purchases of \$35,902.13. The cash receipts were \$247,526.69. There was derived from royalties under the Selden patent \$150,382.70. The disbursements amounted to \$203,601.97, one item of which is \$40,270.45 paid to George B. Selden, and there was also paid over to the Licensed Association \$61,840.95. The balance on hand on April 1 was \$151,356.13, and on May 1 \$195,280.85.

Novelty Manufacturing Company Will Issue Catalogue.—The Novelty Manufacturing Company, of Waterbury, Conn., makers of specialties in metal goods, announces that it will shortly issue a catalogue of automobile hardware and accessories. Its automobile department is now in charge of F. L. Cowles, formerly of C. Cowles Company, New Haven, and late executive secretary and treasurer of the National Association of Carriage Hardware Manufacturers. He is well known in both carriage and automobile lines.

Milwaukee Crippled Children Ride in Ramblers.—Milwaukee's blind, deaf, crippled and invalid children were given a theater party last week, and through the courtesy of A. W. Shattuck, manager of the Rambler Garage Company, of Milwaukee, the branch of Thos. B. Jeffrey & Company, Kenosha, Wis., the little ones were given an automobile ride to the theater and another ride following the performance.

Enlarged Plant for Mayo Radiator Company.—Manufacturing of automobile radiators has so increased that the Mayo Company, of New Haven, has had plans



The De Lissner Trophy.

This handsome cup is offered by the president of the Ajax-Greib Rubber Company for the Maxwell-Briscoe Motor Club's June Tour.

drawn for the addition of two buildings to its plant. The main one will be one story high, built of brick, 150 by 300 feet in dimensions, and the smaller one will be 40 by 60 feet, and used for a box shop.

According to Arthur Jervis: "Taxicab drivers in New York, where twenty blocks on the avenues measure exactly a mile, boast that on rainy days they can register a mile every seventeen blocks, on the asphalt, because of the skidding of the wheels."

Diamond Tires on Flag to Flag Car.—The Chalmers-Detroit car, which is acting as pathfinder for the flag to flag endurance run from Denver to Mexico City, is equipped with Diamond tires and Marsh quick-acting rims.

IN AND ABOUT THE AGENCIES.

Cleveland Adds to "Fifty Cars Sold Here."—Local automobile trade, which has had a war cry of "Fifty cars sold here," will have to change this, for another agent has come to town, and still another is expected shortly. The arrival is the agency for the United Motor Buggy Company, placed with the Auto Sales Company, the Hupmobile agent, at 1122 Chestnut street. The Schutt buggy, of Cincinnati, will soon be represented by the Weddell House Garage, the inter-State agent, on Frankfort avenue, N. E.

Premier, Philadelphia.—The most recent addition to the Quaker City's "Gasoline Row" colony is the Motor Company, which has secured the local agency for the Premier car, and will be exploited from large and handsomely appointed quarters at 132-134 North Broad street.

Dayton Rubber Company Opens New York Branch.—Under the management of Arthur L. Manley, a branch in New York has been opened by the Dayton Rubber Manufacturing Company at 1595 Broadway. Dayton airless tires will be handled from this location hereafter.

TAXICAB AND TRANSIT.

Mail Automobiles for Japan.—Advisability of transporting mail by automobiles is being investigated by the Japanese minister of communications, according to newspapers of that country. It is proposed to establish a system of distribution and collection in the principal cities at first, and to gradually extend that to distant points not reached by railroads. Tokio and Osaka will get the first of the cars and it is said that Tomojiro Oguri, a merchant of the former place, will act as a contractor to supply them. If the autos are imported they will be free of the 50 per cent. duty ad valorem now levied, but it is likely if the proposition is favorably considered that the cars will be constructed in Japan, only the motors, tires, coils, and a few parts being imported.

Plainfield to Metuchen, N. J.—On a 45-minute schedule a passenger, mail and package line has been instituted between Plainfield and Metuchen, via Oak Tree. Two cars of 20-passenger capacity will be put into operation immediately, with an additional one held in reserve for rush hours, and orders will be placed for larger machines to seat 36 people, with a double-deck arrangement. The distance is 94.5 miles and the machines have been tested over the route at a three-quarters of an hour headway, giving satisfactory results.

Nashville Gets the Habit.—Taxicab service is about to be instituted in Nashville, Tenn., by a company which has been formed there with a capital of \$30,000. A number of cabs will be purchased very shortly and put into immediate use. The concern is composed of a number of wealthy business men, among them being Major E. C. Lewis, D. S. Williams, G. E. Bennie, Banks Bennie, H. S. Frazier and James Frazier.

Rome to Adairsville, Ga.—Capitalists of Rome, Ga., are planning to establish an automobile line between that city and Adairsville, a distance of 18 miles, over the fine roads of Bartow and Floyd counties. The railroad schedules are inconvenient, and two round trips daily are suggested for the autos.

Atlanta, Ga.—For the use of its fire department chief the city has appropriated \$4,000, with which to purchase an automobile. A choice will be made shortly, and the car selected must have a body suitable for carrying two fire extinguishers and other apparatus.

Swarthmore, Pa.—A company has been organized to be known as the Swarthmore Service Company, and will run an automobile bus line between the station and the town.

PERSONAL TRADE MENTION.

William B. Hurlburt Will Remarry.—A marriage license has been issued in New York to William B. Hurlburt, manager of the New York branch of the E. R. Thomas Motor Company, and Miss Mary Elizabeth Malloy. Mr. Hurlburt and his former wife, Mrs. Charlotte Hurlburt were divorced in Detroit two weeks ago.

Peter Dumont, who was connected for over two years with the Pope-Waverly, and for five years as manager of the automobile department of the New York Studebaker branch, has joined the commercial vehicle forces of the Baker Motor Vehicle Company, with headquarters in the New York branch at 1788 Broadway.

A. S. Blair, who recently severed his connection with the Mar-Del Mobile Company of Baltimore, has accepted a

position on the sales force of the Zell Motor Car Company, representative of the Peerless and Chalmers-Detroit.

O. P. Smith, who has been manager of the Studebaker electric department in Kansas City, Mo., has resigned to take a position as manager of the Hathaway Electric Car Company at 1606 Grand avenue of the same city.

Wallace C. Hood, well known in Baltimore automobile circles, has become the general sales manager of the Motor Car Company, the agent in the Monumental City for Thomas, Stevens-Duryea and E-M-F cars.

James Joyce, manager of the American Locomotive Company automobile department, who recently spent two weeks at the Country Club in Farmington, Conn., will, it is said, make his Summer home in that town.

Warren J. Shay, formerly salesman with the Denver agency for the Stearns, has taken a position as Cleveland salesman for the Gaeth Automobile Company, of Cleveland.

NEW AGENCIES ESTABLISHED.

Frontenac: Nassau County, L. I., N. Y.—Anton T. Smith, Motor Parkway Garage, Jericho turnpike and Tyson avenue, Floral Park, N. Y.

Pierce-Arrow: San Antonio, Tex.—Lumley-Wood-Brownlee Auto Company, direct agent, formerly sub-agent of Houston Motor Car Company.

Babcock: Philadelphia.—Stoyle & Vogel, in addition to the American, Grout and Midland.

Jackson: Utica, N. Y.—C. H. Childs & Company, Lafayette and Seneca streets.

Chalmers-Detroit: Indianapolis, Ind.—Indiana Automobile Company.

Rambler: Atlanta, Ga.—Baynard Wellingham, 70 South Forsyth street.

Frontenac: Brooklyn, N. Y.—P. J. Forbes, 96 Schermerhorn street.

Brush: Plainfield, N. J.—Laing Machine-Auto Repair Company.

Mitchell: Lambertville, N. J.—O. M. Driscoll, East State street.

Haynes: Kansas City, Kan.—Seberlin & Boyd, 1 Fifth avenue.

Fuller: Boston.—E. P. Blake, Haymarket Automobile Station.

Hupmobile: Brooklyn, N. Y.—Parkside Automobile Station.

Gaeth: Minneapolis, Minn.—McAllister-Newgord Company.



REO Leads the British Army a Merry Chase.

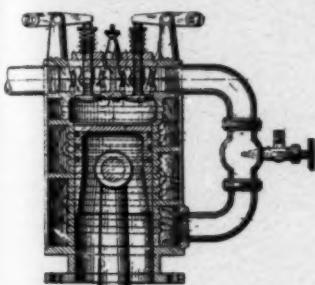
REO car at the head of the parade of automobiles, carrying 1,000 soldiers from London to Hastings in the recent military tests of the utility of the automobile in time of war by the British Government.

SOME SELECTED AUTOMOBILE PATENTS

Issue of May 4, 1909.

920,167. Internal Combustion Engine.—John J. McIntyre, Hartford, Conn. Filed Feb. 28, 1907.

In this engine McIntyre has a new cooling scheme, the casing of the air-cooled cylinder

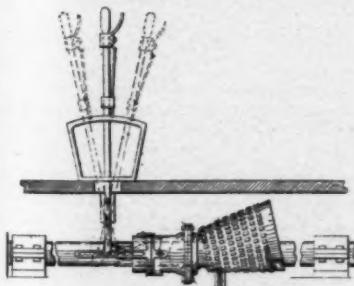


McIntyre's Air Cooling Scheme.

ders, which have extending flanges, being formed into a continuous and circular passage within which the air is circulated. The heated air as it finally emerges from this passage is sent to the carburetor.

920,190. Transmission Mechanism.—Benjamin F. Seymour, Denver, Col. Filed Dec. 12, 1907.

Here is a transmission device, which is capable of being carried out to great limits, thus providing many more speed changes than are now used. And still this is not a friction drive. An immense bevel gear, with

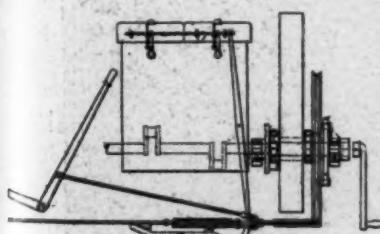


Seymour Multiple Speed Transmission.

teeth cut in rows so as to form a number of different bevels, is in mesh with a regular spur gear. The big cone-shaped gear is sildable, so that any desired combination may be had, thus giving any desired speed. Seymour also has his own method of securing the speed changes.

920,411. Starting Device for Explosive Engines.—Howard C. Bailey, Philadelphia, assignor to Elsie L. Bailey, Philadelphia. Filed July 12, 1907.

Bailey has a scheme here for starting by the pull of a hand lever, which releases a spring and at the same time causes a spark. The spring turns the engine over, and the spark fires the charge then drawn in and



Starting Device by Bailey.

thus keeps it turning over. No means being

provided for correctly timing this spark, it is hard to see how it is to be effective.

920,257. Sparking Plug.—Ralph C. Browne, Salem, Mass., assignor to Browne Apparatus Company, Salem, Mass. Filed April 25, 1908.

920,289. Pneumatic Tire.—James W. Earnhart, Los Angeles, Cal. Filed Sept. 28, 1907.

920,326. Sparking Mechanism for Automobiles.—George S. Hill, Bradford, Mass., assignor to Hill Motor Car Company, Haverhill, Mass. Filed Nov. 20, 1905.

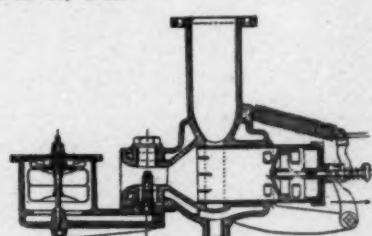
920,363. Transmission Mechanism.—Frank H. Merrill, Plainfield, N. J. Filed Feb. 3, 1905.

920,404. Resilient Hub for Wheels.—Albert E. J. Smith, Battersea, London, Eng. Filed April 3, 1907.

920,486. Vehicle Wheel.—Henry O. Jackson, Chicago, assignor to Jackson Wheel Company, Chicago. Filed June 6, 1908.

920,515. Starting Device for Explosive Engines.—Joseph Zagora, Chicago. Filed March 7, 1908.

920,642. Automatically Governed Carburetor.—Otto Pfander, Brussels, Belgium. Filed March 25, 1907.



Automatically Governed Carburetor.

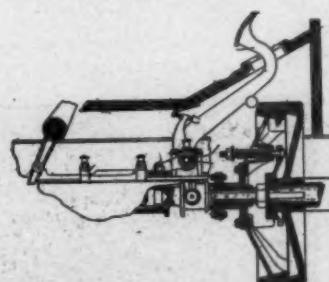
This is not as automatic as the title would lead one to think. The automatic part consists in the control of the auxiliary air supply. It is so connected up that any variation in the main air supply, by hand operated means is also exerted to change the auxiliary air ports automatically. Otherwise the carburetor presents no unusual features.

920,724. Electrically Operated Starting Device.—Harold H. Brown, Boston. Filed July 27, 1907.

Issue of May 11, 1908.

920,916. Control Mechanism.—Howard E. Coffin, Detroit, Mich. Filed April 18, 1908.

This is the clutch and change gear control of the Chalmers-Detroit 40, as now



Chalmers-Detroit Control System.

used. The clutch is a cone, leather faced, and its action is interlocked with the speed changes, and the shaft brake on the main drive shaft. The clutch action is also interlocked with the emergency brake lever, so that the application of the brake throws out the clutch.

920,979. Carburetor.—Gardner E. Morehouse, Kansas City, Mo. Filed Jan. 25, 1908.

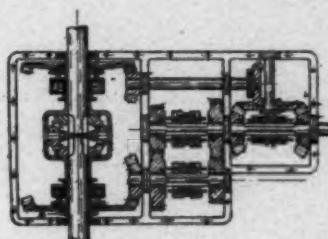
920,984. Vehicle-Wheel Hub.—Thomas L. McConaughey, Hagerstown, Ind. Filed Dec. 26, 1907.

920,989. Combustion-Engine.—Oscar P. Ostergren, New York, N. Y., assignor to William M. Power, East Greenwich, R. I. Filed Oct. 15, 1904.

920,991. Valve Mechanism.—Harry E. Perault, Detroit, Mich. Filed Oct. 24, 1907.

921,035. Internal-Combustion Engine.—Carl W. Weiss, New York, N. Y. Filed Oct. 14, 1907.

921,078. Speed-Changing Mechanism.—Frederick C. Brunhouse, Philadelphia, Pa. Filed Oct. 24, 1908.



Individual Clutch Transmission.

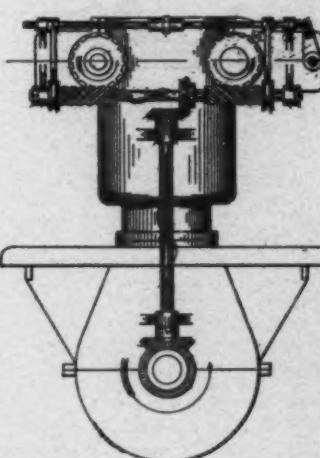
Brunhouse has here a new way of operating and constructing an individual clutch type of transmission. There are a number of clutches to be operated, too many in fact, as some of them appear needless. The transmission apparently gives more than the usual number of speeds.

921,174. Pneumatic Tire.—William H. Snyder, Kenton, Ohio. Filed Dec. 23, 1907.

921,233. Variable-Speed Mechanism.—James A. Goodner and Albert P. Kendig, Rocky Ford, Col. Filed Sept. 23, 1907.

921,264. Gas Engine.—Cyrus E. Mead, Dayton, Ohio. Filed March 25, 1908.

The recent agitation for rotary valves has stirred up the inventors and one of these, Mead, has an idea which appears to be all right. The two valves for the inlet and ex-



Mead Engine with Rotary Valves.

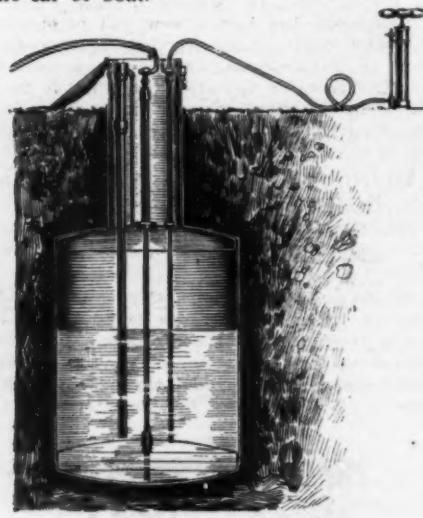
haust appear to be separate, which is different from the ordinary rotary valve, in which simplification is aimed at and attained by the use of a single valve for both.

921,283. Resilient Wheel.—Jean Reuse and Charles Reuse, Hal, Belgium. Filed March 14, 1908.

921,491. Driving Mechanism for Railway Cars.—Rollin H. White, Cleveland, Ohio, assignor to the White Company, Cleveland, Ohio. Filed Sept. 14, 1906.

Information for Auto Users

Air-Tight Steel Tanks for Gasoline.—The action of the more progressive municipalities in specifying that all gasoline must be stored underground, has created an unusual demand for steel tanks suitable for this purpose. The Air-Tight Steel Tank Company, of Pittsburgh, report so large a demand for tanks that even with their large facilities for this class of tanks they have been unable to fill all orders. The equipment which is put out consists of an absolutely air-tight steel tank, made in one, two, three and five-barrel sizes, with brazed joints, no rivets nor solder, a superimposed dome, and fitted with a special lock which rises only a few inches above the ground after the tank has been properly placed in the ground, a supply pipe for filling, and a special pump for drawing the gasoline into the car or boat.



AIR-TIGHT STEEL TANK.

When the tank has been installed and the dome locked, it is not only almost invisible, but there is no odor as with an ordinary gasoline reservoir. For drawing the fuel out, the supply pipe is fitted with a rubber-tube extension, which conducts the gasoline directly into the reservoir. A similar rubber tube is connected with the special air pump, and by the operation of this pump forces the gasoline through. A few strokes of the pump is sufficient to raise a tank full. When this is full, the air in the tank is allowed to escape and as it does the surplus fuel is drawn back into the air-tight tank.

Hydraulic Windshields.—Emil Grossman Company, of New York, is marketing a new type of windshield known as the Hydraulic or Springaction, in which a feature is the set of cylinders and pistons which prevent the folding part from slamming and breaking. On each side of the shield is placed this device, as hydraulic, filled with oil or glycerine, or with a spring, and they operate automatically and positively, according to the makers. When the shield is either up or down, all that is necessary is to start it to the other position and the

spring action does the rest. The procedure is much similar to that of door checks. The frame is made of heavy brass, with a filling-in board of mahogany or walnut. A sub-channel of copper lined with felt forms a cushion for the glass and does away with the rattle. The strip of brass across the middle of the shield at the dividing point is narrow.

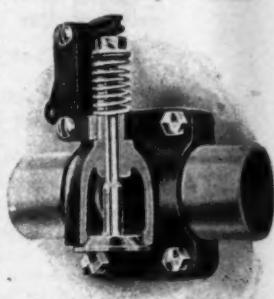
Economy Garages.—Inasmuch as the problem of storing an automobile is a pertinent one with the prospective purchaser of a touring car or roadster, the use of private garages has become very popular. The Nicola Building Company, Farmers' Bank Building, Pittsburgh, Pa., in a recent booklet issued, gives the details of its "Economy" garages, illustrated by blue prints and colored plates. These buildings are not portable ones; they are ready-made and permanent, fitted together before leaving the factory and giving the buyer only the work of assembling. They are made of wood, raised from the ground on solid supports, and of ample size. A work bench and a tool closet are included.

B. & S. Auto Kit.—A handy kit of tools for use on automobiles is being placed upon the market by the Billings & Spencer Company, of Hartford, Conn. The kit is made up of drop forged steel tools exclusively of the same high quality as, and selected from, the large variety of the machinists' tools manufactured by the company. It is believed that the selection in this kit will reach the needs of the average automobilists inasmuch as there is very little work done upon a car, except perhaps in shop overhauling, which cannot be handled by the B. & S. outfit. A well-made canvas bag is used to carry them, rolled up, and of such size as to fit snugly into a tool box. In the roll are the following instruments: a screw driver, nine inches long; a ball pein hammer, weighing 8 ounces; six full finished general service wrenches, with twelve openings varying in size from one-quarter of an inch to fifteen-sixteenths, by sixteenths of an inch, and if desired some other set of sizes may be

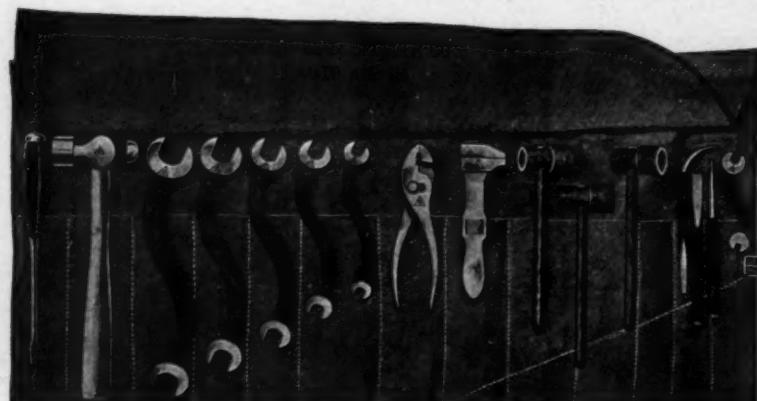
substituted for this one; a six-inch pair of nickel combination pliers; a nickel monkey wrench; three double-end socket wrenches, giving six openings for nuts varying in size from three-eights of an inch to seven-eighths, hexagon; a tool for pulling out cotter pins; a center punch; and a three-eighths of an inch cold chisel. This shows the comprehensiveness of the outfit, and the inclusion of a set of socket wrenches will be greatly appreciated by autoists who have tried to get nuts loose from difficult places by the ordinary monkey or S wrenches.

Novel Muffler Cut-Out.—Many an autoist has wished for a good cut-out valve, one that is so arranged as to prevent the destruction of the muffler in case of an accidental backfire, and yet is simple and easy to operate. These will be pleased to hear that such a device is now put on the market and may be obtained from any dealer. It is the Clamp valve, made by the Motor & Manufacturing Works Company, Geneva, N. Y. The name is given to it because it may be applied without taking anything off, as the construction is such that it clamps over the pipe. The valve is arranged to open outward, and in the event of a muffler explosion, this will open and allow the gases to escape. Thus, it acts as a safety valve as well as a cut-out valve.

The yoke which carries the lever is free to turn around the valve stem and is then held in the desired position by means of a set screw. This allows of setting the lever so that the pull from the foot pedal is always in a straight line, and obviates the necessity of a pulley in this line. The valve will work equally well in any position, and is designed to meet the requirements of the repair man, or to be used wherever it is necessary to attach a cut-out valve to an engine on which the piping is already connected. It is made in all sizes from 1 inch piping up to 3 inches, and other larger sizes will be made to order. The only work necessary to attach one of these is to cut a V-shaped notch in the pipe with a hack saw before clamping on the valve, which is simply a matter of bolting in place.



CLAMP VALVE FITTED TO PIPE.



BILLINGS & SPENCER AUTO KIT, WITH A FULL SET OF WRENCHES.